FOOD ENGINEERING

September 1952

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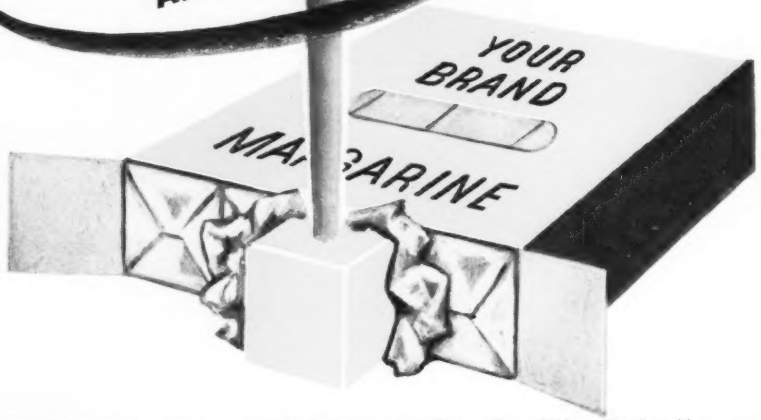

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Food Engineering

Vol. 24 • SEPTEMBER, 1952 • No. 9

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FOOD ENGINEERING
(Formerly Food Industries)
September, 1952 Vol. 24, No. 9
Member ABC and ABP

Published Monthly by McGraw-Hill Publishing Company, Inc. James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Div.; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.

Subscriptions: Address correspondence to Food Engineering—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.

Single copies 35c. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y. under Act of Mar. 3, 1879. Printed in U.S.A. Copyright 1952 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

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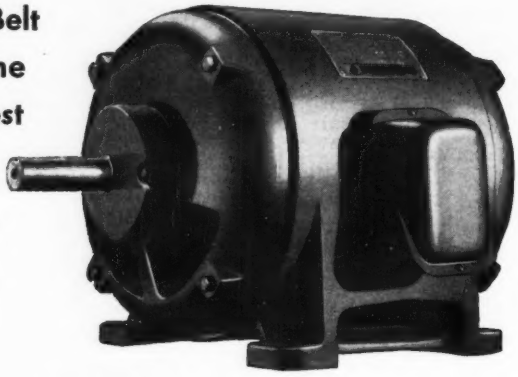

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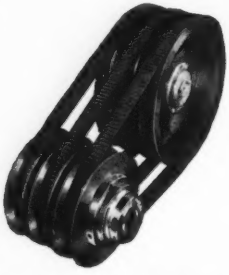

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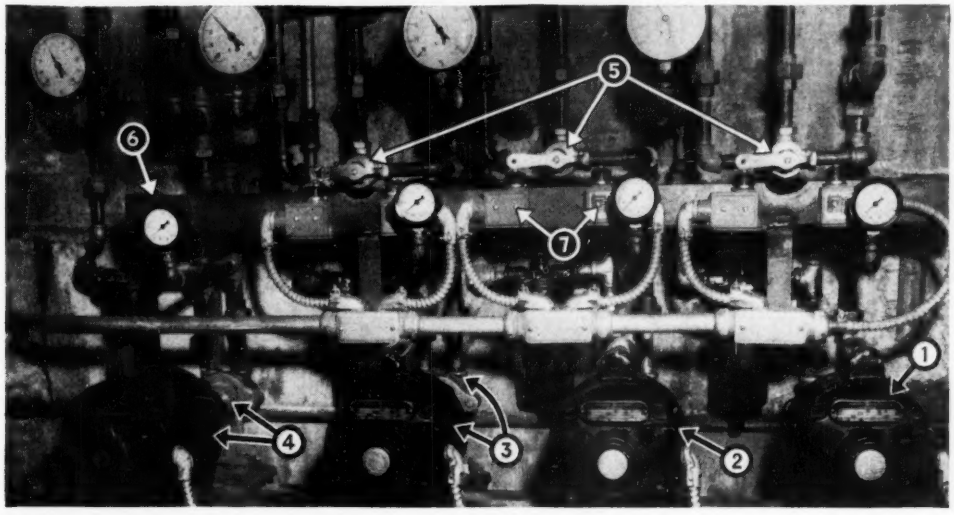

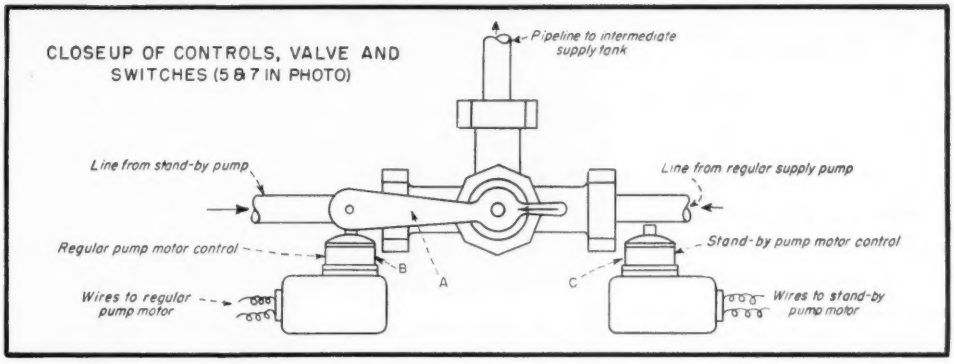
CLOSEUP OF CONTROLS, VALVE AND SWITCHES (5 & 7 IN PHOTO)
Pipeline to intermediate supply tank
Line from stand-by pump
Line from regular supply pump
Regular pump motor control
Stand-by pump motor control
B
A
C
Wires to regular pump motor
Wires to stand-by pump motor

Controls Solve Fuel Pumping Problem

Just a 180 deg. flip of a 3-way valve-handle on our fuel supply system, shifts the movement of liquid to another pump and simultaneously starts the stand-by pump motor. This type installation has many advantages.

Our battery of bean-baking ovens is fired by carbureted kerosene. Latter flows to a group of gas generators, by gravity, from one of three horizontal supply tanks located near the plant ceiling.

Through float controls, liquid level in the tanks is maintained at a near-constant-head. When the fuel in one of the tanks drops to the low level, the supply is automatically replenished by that tank's separate pump and motor—(1), (2), and (3) in photo.

Fully dependable was the fuel supply using this system, except when a pump or motor failed. However, installing a stand-by pump and motor (4) only partially solved the problem of pump or motor failure. Though the mechanics who installed the assembly and a few others including department heads, could be depended on to open and close the right valves and to stop and start the proper motors—it was too much to expect correct manipulation from all workers (including night crew) who might act in an emergency.

Therefore, it was imperative that the system be made fool-proof and this is how we did it.

First, three-way valves (5) were installed on the lines leading from the feed pumps to each of the intermediate supply tanks. They were attached so that one valve inlet connected with the pressure side of the pump normally in use, the other with the pressure side of the stand-by pump.

Then, on a steel cross-member (6), a pair of micro-switches (7) were mounted beneath each three-way valve. Switches were so placed that when the valve handle—(A) in sketch—is in the position shown for fuel delivery from the normally-used pump, micro-switch (B), which controls the motor, is closed.

Now, if the valve is swung through 180 deg.—to open the line from the stand-by pump—the circuit to the pump's motor is simultaneously closed by the valve handle which depresses the contact of switch (C).

In case the shift from regular to stand-by is so rapid that

ALLIS-CHALMERS
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DRIVES

Simplify

YOUR DRIVE DESIGN PROBLEMS

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Complete matched control for any motor, including manual and magnetic starters, pushbuttons, and variable speed control.

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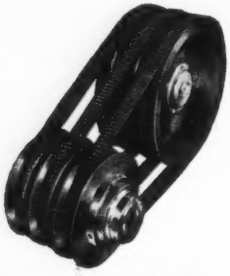

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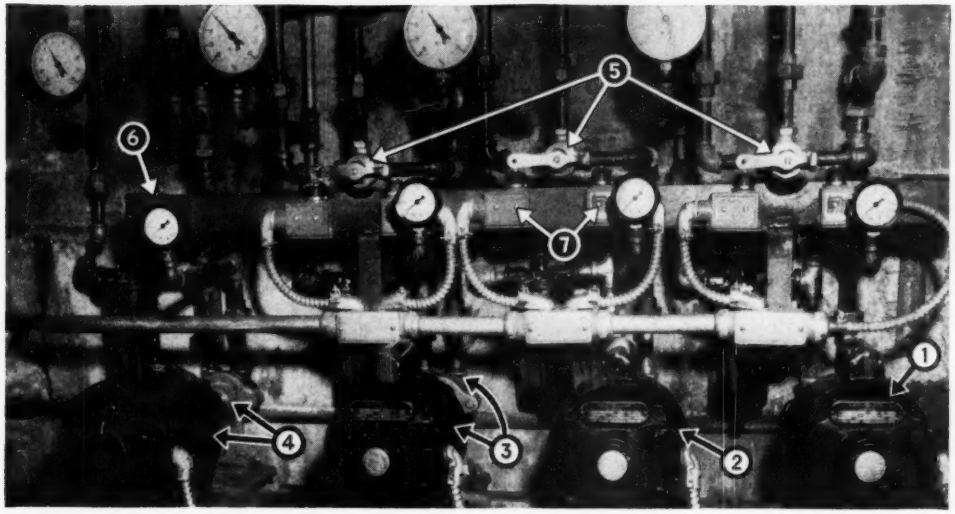

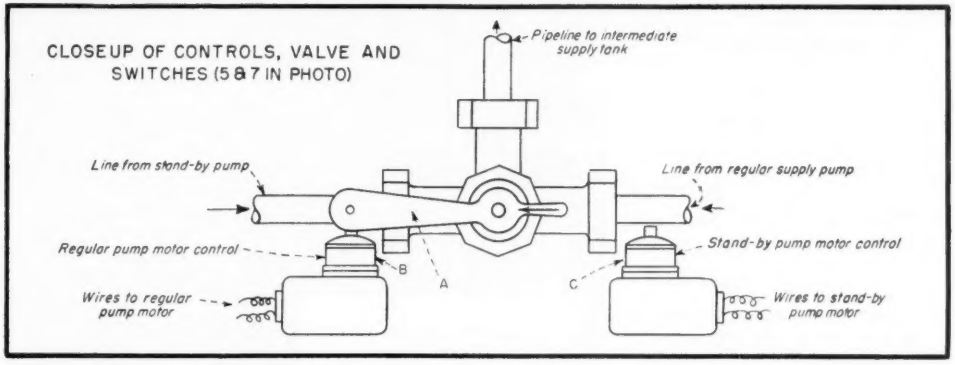
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In case the shift from regular to stand-by is so rapid that

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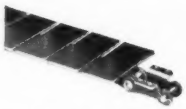

Class RC flat top chain — precision made for smoothest, spill-free carrying and long life.

Class 400 swivel chain — carries cartons, cases, etc. over paths with both vertical and horizontal turns.

Class RC crescent flat top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

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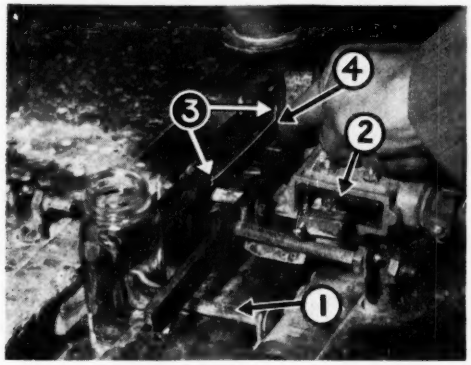
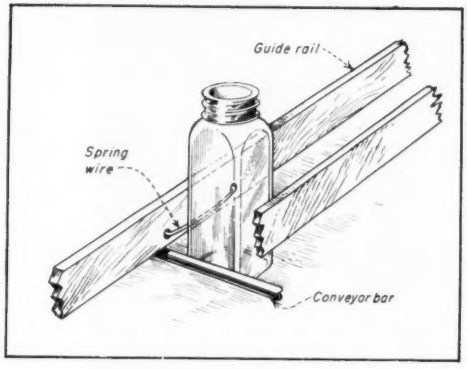
pressure, due to pump and motor momentum, builds up in the closed line, a relief valve is provided to prevent damage.

Since the arrows on the valve handles indicate the direction fuel is flowing to the delivery line, and also the pump in use, the system is practically fool-proof, regardless of the worker operating it.—*B. L. Ellis, Plant Engineer, Friend Bros., Inc., Malden, Mass.*





Spring Wire Perfects Filler Action

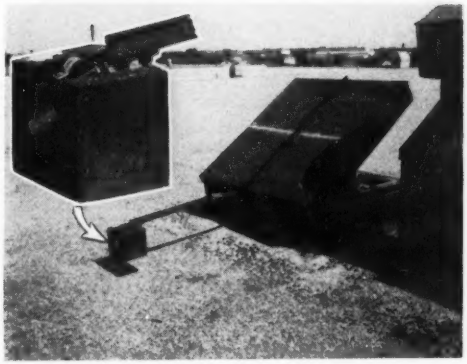
Addition of a short length of spring wire, projecting through the empty jar guide, assures correct location of containers during filling.

Jars approach the filling spout in intermittent steps, moved along by a bar-chain conveyor—(1) in photo. Then when a microswitch (2) is tripped just as the jar arrives under the filling spout, product flow is started.

Formerly, the impact of the conveyor bars too often slid the jars beyond the correct filling position under the spout. And because of slight variations in jar size and shape, adjustment of the guide rails did not prevent overtravel of jars. Narrowing the space between them caused binding and jar breakage.

To prevent the jar over-travel, holes—(3) in photo—were then drilled in one of the guide rails. And through the holes a single strand of spring wire (4) was passed.

Now, the slight pressure of the wire holds the jar (see sketch) against the conveyor bar, and in exact position for filling.—*Russell F. Greenough, Stickney & Poor Spice Co., Boston.*



Counterweight Ends Trap-Door Hazard

A weight on the end of an angle-iron fulcrum, attached to a heavy trap-door covering the entrance to the roof of our plant, has put an end to a constant threat of serious accidents.

Since some 20 exhaust blowers are located above the roof, frequent trips "top-side" are necessary. And a single trap-door, reached by ascending a metal ladder, gives the only access.

The opening is large, about 3 ft by 3 ft.—and the hinged cover is proportionately big and heavy. In fact, so heavy is the lid that the full strength of a man on the ladder was required to lift it. Dropping the lid back when descending was even more difficult. Utmost caution was always necessary to prevent accident.

Now the lid can be opened with little effort. And once elevated it remains raised until pressure is applied to lower it.

Easing the operation of raising and lowering the door was accomplished by extending an angle iron from the

$50 Extra for Best Item

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You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

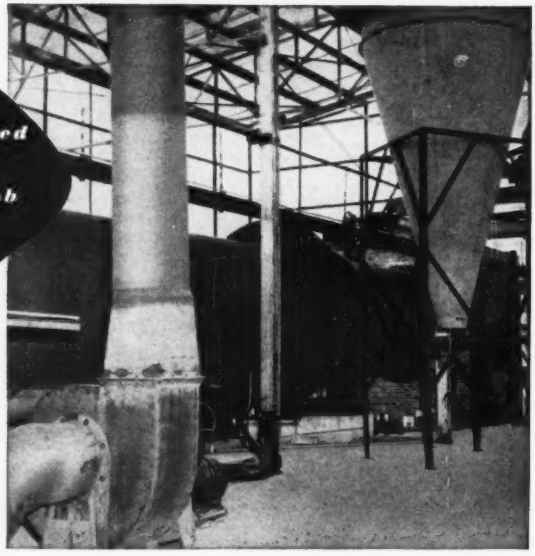
JULY PRACTICAL IDEA voted best was "Box Chute Made of Bent Pipe," submitted by Stokes Homan, Poultry Technologist, Armour and Company, Salisbury, Md. Explained was a simple method of fabricating bent pipes and angle iron into an inexpensive gravity chute for conveying poultry packing crates made of wood.

See Louisville for

CREATIVE DRYING ENGINEERING

How a new Louisville Dryer can lift production by 4½ times...profits by $11.54 per ton

Designed to do your job best!



FORMER DRYER

Installed cost	$9,000.00
Annual production (tons)	450
Drying cost per ton	$18.60
Capacity, lbs. dried product per hour	600

LOUISVILLE DRYER

Installed cost	$36,000.00
Annual production (tons)	2,025
Drying cost per ton	$7.06
Capacity, lbs. dried product per hour	3,500

EXTRA PROFIT PER TON DRIED WITH LOUISVILLE DRYER $11.54

Don't call in a "boy"—when the job is man-size! Small-production dryers *can* cost you big money—as the performance comparison figures shown here prove clearly. Here's black-and-white proof that it pays to have a Louisville engineer check over your dryer capacity.

A study of your problem may show that a larger-capacity Louisville dryer—especially designed for your purpose—will turn out 4½ times more production—with little if any increase in your labor costs. In fact, labor savings alone may spell the difference between a good profit or a sagging loss.

Find out what a specially designed Louisville dryer—with output pretested in our own unique laboratory and pilot plant—will do for you. Ask for a Louisville survey of your problem. There is no obligation.

Other General American Equipment:
Turbo-Mixers, Evaporators, Dewaterers, Towers, Tanks, Bins, Filters, Pressure Vessels

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

Louisville Drying Machinery Unit
Over 50 years of creative drying engineering
GENERAL AMERICAN TRANSPORTATION CORPORATION
Dryer Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
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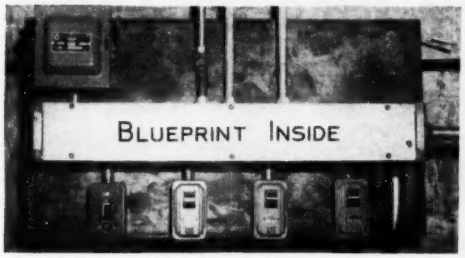
Offices in all principal cities
In Canada: Canadian Locomotive Company Ltd., Kingston, Ontario

hinged side (photo, p. 7), and attaching counterweight on the end. The fulcrum is so arranged that the door is somewhat "lighter" when open and somewhat "heavier" when closed.

This advantage is brought about by attaching the fulcrum at an angle, so that whichever side of the "teeter" is down, that side has a slight advantage in weight exerted.

Counterweight is held centered (see inset) by means of hose-clamps on the cross-bar.—*D. B. Bradshaw, A. H. Johnson Co., Boston.*

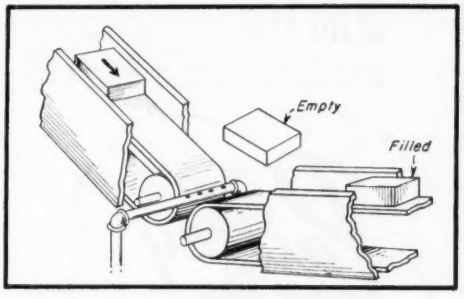


Circuit-Repair Confusion Avoided

Electric line repairs have been speeded, and blunders avoided at our plant, by building permanent metal cases for wiring diagrams on control panels at the junction of electric circuits.

On too many occasions in the past, a dead circuit required a frantic search through bulky files for the wiring diagram which would speed repairs and prevent costly errors.

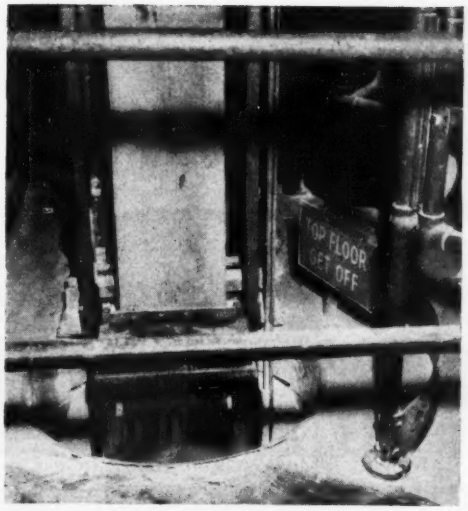
Now, a correct blueprint is always at hand, enclosed in the case, accessible merely by unscrewing the cover to reach the wires. Of course, it is mandatory that the wiring diagram be again sealed in the case when repairs are completed.—*B. L. Ellis, Plant Engineer, Friend Bros., Inc., Malden, Mass.*



Air Jet Detects, Kicks Off Empties

Compresed air, piped to the transfer point where filled packages are relayed from one conveyor to another, serves to detect unfilled containers and toss them off the packaging line.

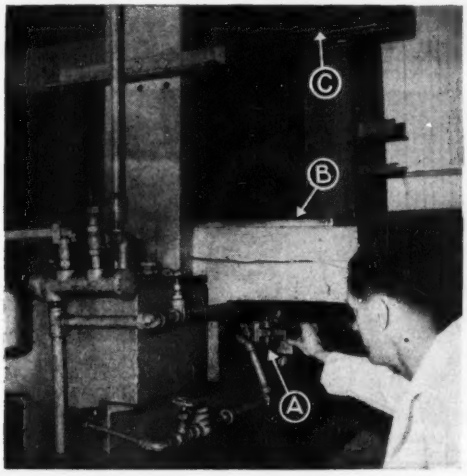
Streaming upward from holes drilled in a pipe (see sketch), the compressed air has sufficient force to hurl empty packages several feet high and away from the conveyor. Filled containers are too heavy to be influenced by the force of the air.—*FE Staff.*



Device Improves Man-Lift Safety

By placing a red-lighted sign, "Top Floor, Get Off", where it shines in the eyes of riders at the last dismount level, we have contributed to the safe operation of our man-lifts.

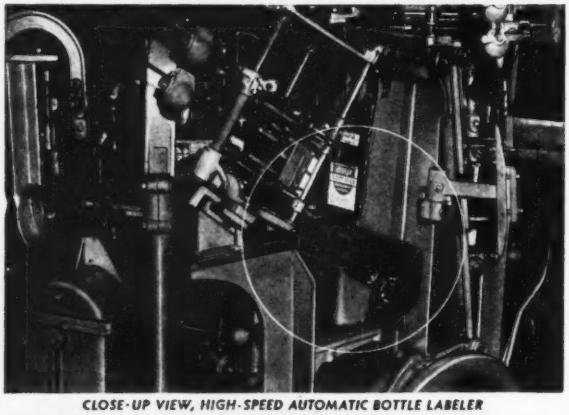
Further, to insure the warning sign's effectiveness, lights are wired into the lift-motor control system. Thus, whenever the electric lamp behind the sign burns out, the motor circuit is interrupted, and the elevator stops. And so, the lift operates only when the warning sign is lighted.—*J. George Kehr, Superintendent, Russel-Miller Milling Co., Buffalo.*



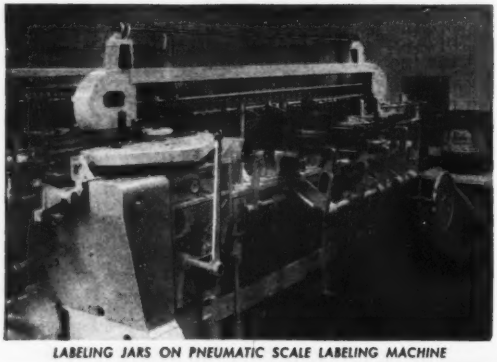
Speeds Hydraulic Press Operation

Installation of a small oil pump, auxiliary to our hydraulic press pump, has greatly reduced the time between loading the press and the start of our juice extraction operation.

LABELING BOTTLES ON ERMOLD LABELING MACHINE



CLOSE-UP VIEW, HIGH-SPEED AUTOMATIC BOTTLE LABELER



LABELING JARS ON PNEUMATIC SCALE LABELING MACHINE

FOR THOSE *Difficult* BOTTLE LABELING JOBS.. A NEW COOLER-PROOF GLUE

PAISLEY COOLER-PROOF Glue is a remarkable product of modern scientific adhesive research. *It's the answer* to those difficult but not unusual labeling conditions found in so many food plants! Many glass and tin packed products are labeled direct from hot retorts. Others are labeled while soaking wet. Meat products, salad dressings, and other foods may have an oily or greasy film on the container which defies the usual dextrine base labeling glues.

The new COOLER-PROOF Glue is extremely versatile! 1. It handles hot, cold, wet, and greasy containers, 2. Accepts quick changeovers from one size to another, 3. Improves production on *old* labelers, 4. Won't mess, drip or spatter, 5. Tenacious body produces a tacky glue film, highly water resistant, 6. Ideal for intermittent operation as it doesn't dry glassy hard on picker arms between runs.

SEND FOR *Generous trial offer and our TECHNICAL SERVICE BULLETIN No. 15. It gives a wealth of valuable information about this new Cooler-Proof Glue and its many uses. Take advantage of this free service. Write, on company stationery, TODAY!*

Paisley SCIENTIFIC ADHESIVE SERVICE

PAISLEY PRODUCTS INCORPORATED

1770 CANALPORT AVENUE, CHICAGO 16, ILL. PHONE CANAL 6-2219
630 WEST 51st STREET, NEW YORK 19, N.Y. PHONE COLUMBUS 5-2860

Manufacturers of Glues · Pastes · Resin Adhesives · Cements and related Chemical Products

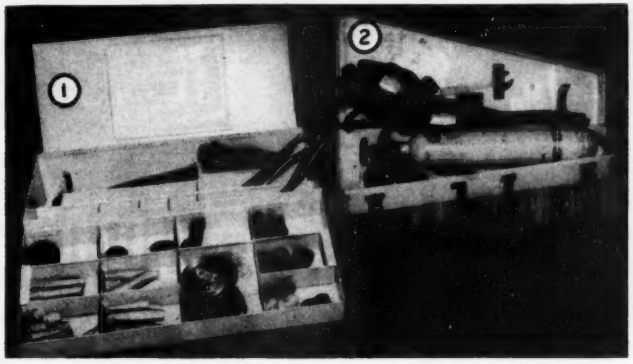
Formerly there was a creeping movement of the plunger, causing a long interval of time between the finish of filling the press and engagement of the racks with the top of the unit.

This is how the speed-up was accomplished:

Delivery end of a small motor-driven oil pump—(A) in photo—was piped to the line between the hydraulic pump and the press; suction end to pump reservoir.

Now, when the press bed (B) is to be raised, the small pump is started. Its pressure, compared to that of the hydraulic pump, is relatively low, but its volume is comparatively high. Thus, the press bed is raised rapidly until contact is made with the block (C).

Then the hydraulic pump is brought into operation for actual juice extraction.—*Robert Korn, Plant Engineer, Henry & Henry Inc., Buffalo.*



Emergency Kit Speeds Repairs

We have found it profitable to provide an "Emergency-Kit," a specially labeled and located case (left photo), containing tools and equipment for rapid, temporary repair of burst or leaking pipes, especially ammonia lines.

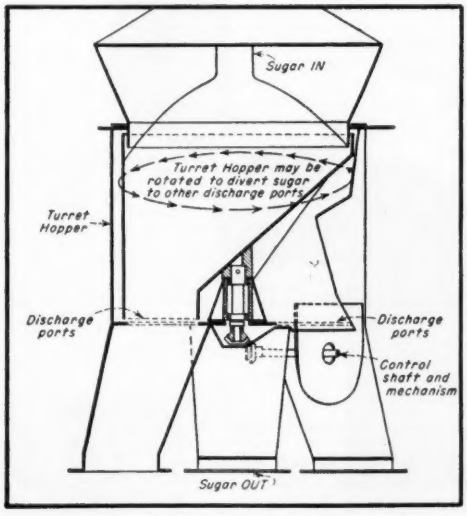
Here are the tools kept in the case and the types of materials used for emergency repairs—

Assembly includes a yellow-painted metal case—(1) (right photo)—in which are two layers of compartments for the tools and supplies. In the bottom compartments are tools such as hammer, wire-cutting-pliers, grip-pliers, rubber gloves, etc. Arranged in the top-tray compartments are rubber stoppers of various sizes, crutch tips, for effective closing of pipe ends, coils of wire, plastic adhesive-tape and tapered wooden pegs of various sizes.

Many of these items were obtained from the government, as war-surplus materials. Tapered pegs are sections cut from pup-tent pins. Made of hardwood, they effectively plug a leak when driven into a hole in a pipe.

Now, when a pipe or fitting springs a leak, there is no longer need to search for materials to control it. Everything needed is in the kits, and locations of the latter are known by those who may need to use them.

Also, located near the pipe repair kit, is a case (2) containing air tank and mask, to be used in the event of a serious ammonia leak.—*Erik W. Holgren, Chief Engineer, Abbotts Dairies Inc., Ice Cream Div., Philadelphia.*



One Hopper Serves Multi-Chutes

A rotating hopper, which was designed at The Amalgamated Sugar Co., Salt Lake City, Utah, makes it possible to send the flow of material, in measured amounts by weight, to any selected station, with minimum use of labor and scant chance of error. This development has served to increase speed and accuracy.

This is done through use of a peripheral series of chutes served by a single rotating discharge outlet incorporated inside the hopper.

Rotating turret portion of the hopper (see sketch) may be operated manually or by remote control. By swinging the single outlet of the turret to a selected outlet duct, sugar can be diverted to storage, to the delivery docks, or to any unit operation station.

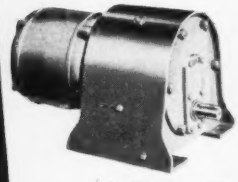
When it is necessary to route material to the tote-bin filler, to truck loading platform, to rail car loading docks, or any other such location, an operator merely rotates the turret outlet to the proper duct, then sets an indicator on a scale-instrument to the number of pounds of material to be delivered.

When the scale mechanism has delivered the correct amount, the flow is automatically shut off, and the hopper may then be turned to discharge into another chute, as desired.—*FE Staff.*

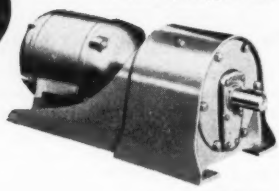
For All Kinds of
Slow Speed Requirements

Specify
Century GEAR MOTORS
Rugged, Quiet,
Long Life Operation

⅛ to ¾ HP Type 2R gear motor. 4.3 to 125 RPM double gear reduction right angle shaft.



1 to 50 horsepower, gear motor.



1 to 50 horsepower, all motor type gear motor.

1 to 50 horsepower, vertical all motor type gear motor.

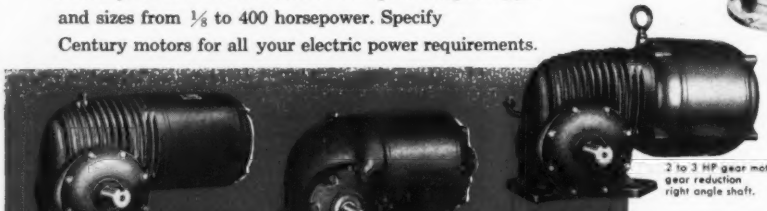
There are dozens of reasons why Century gear motors assure satisfactory performance day after day. Here are a few of them:

Simple design, coupled with accurate machining and rugged construction, produces a rugged unit that stays in alignment.

Precision gear cutting assures quiet operation.

Streamlined design provides improved appearance and smooth easily cleaned surfaces inside and out.

Century Gear motors are available in a wide range of types and sizes from ⅛ to 50 horsepower—in a variety of speeds. Other Century motors are available in a complete range of types and sizes from ⅛ to 400 horsepower. Specify Century motors for all your electric power requirements.



2 to 3 HP gear motor. Single gear reduction right angle shaft.

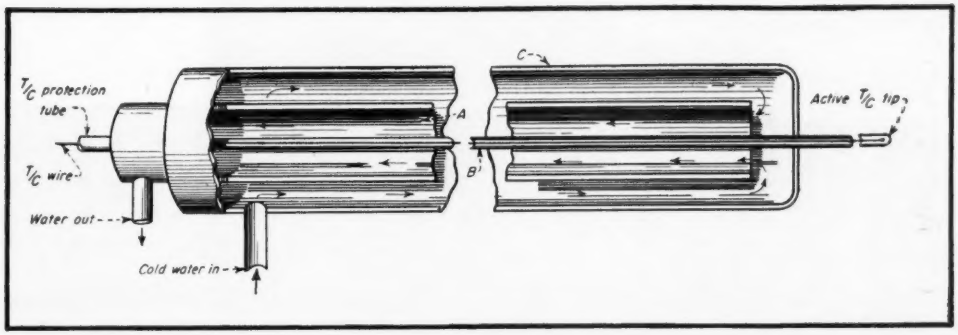
1 to 1½ HP Type 1R gear motor. 57 to 280 RPM single gear reduction right angle shaft.

½ to ¾ HP Type 1R gear motor. 25 to 280 RPM single gear reduction right angle shaft.

▸692

CENTURY ELECTRIC COMPANY 1806 Pine St., St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

Century C MOTORS



Prevents Thermocouple Burn-Outs

Water-jacketing of thermocouple tubes in our rivivifying kilns has ended costly couple replacements.

Before the improvements were made, the high temperature of the kiln (1,500 deg. F.) together with the hydrogen gas atmosphere developed, resulted in too frequent T/C burn-outs.

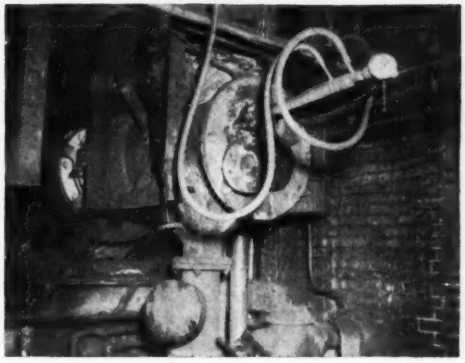
Also, the situation was aggravated by the fact that in our operation it is necessary to have the couples extend 6 ft. into the heat-zone of the furnace. Periodic bending of the housing tube resulted. The most efficiently constructed units soon grounded.

Water jacketing was the answer. With this protection for the T/C tube (see photo) heat damage to the couples has been greatly reduced.

This is how the cooling unit is constructed:

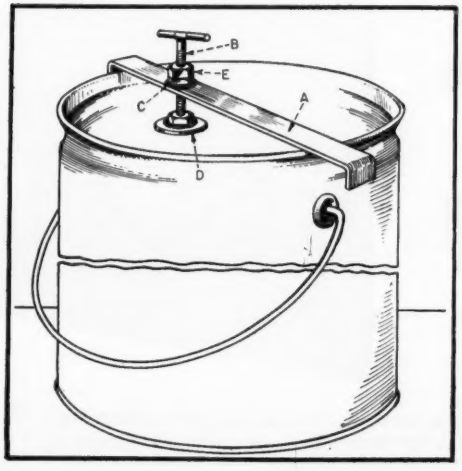
First, two lengths of bronze, heat corrosion-resistant tubing were selected. The smaller length—(A) in sketch—fits around the T/C tube (B) with clearance for water circulation, while the larger length (C) manifolds the smaller to form an outer jacket.

To each of these, a small pipe was attached near one end to serve as cooling water inlet and outlet. Then, when the parts were assembled, the end of Tube A (sketch) was sealed around the T/C tube at the water inlet end, tube C was sealed to B at the same end.



Finally, tube B and the T/C were sealed at the opposite end, allowing space between the ends of A and C for water movement.

Now, when the jacketed unit is in place in the kiln, with water circulating through the unit, the inner T/C tube is never raised to a damaging temperature.—*John Shaffer, Instrument Engineer, Corn Products Refining Co., Pekin, Ill.*



Simple Gage Controls Bucket Fill

From a strip of sheet metal, a bolt and nuts, it is easy to fabricate a level indicator by which the fill of buckets can be rapidly and accurately controlled.

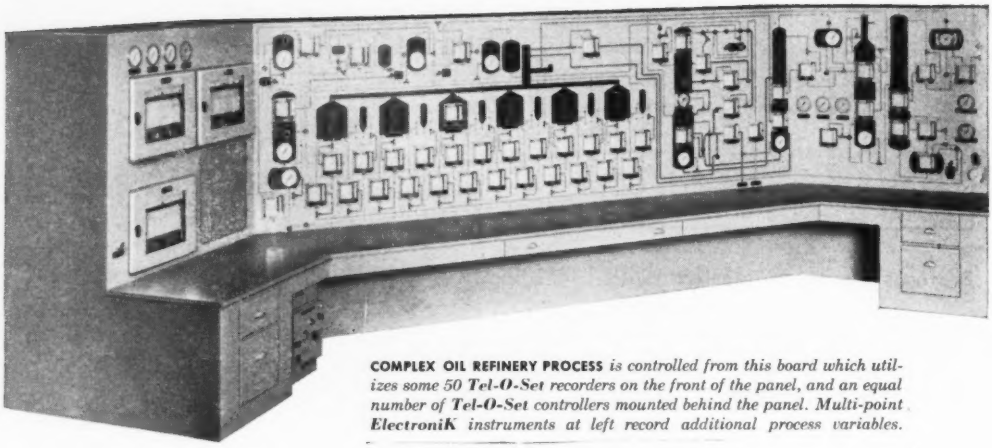
The length of strip metal—(A) in sketch—is formed with bent down ends, length between sufficient to span the buckets. Through the strip a hole is drilled large enough for a ¼ in. bolt (B) to pass through, and over the hole is welded a ¼ in. nut (C).

Nut-and-disk assembly (D) is fabricated by welding a ¼ in. nut to a washer or metal disk of 1–1¼ in. diameter.

Now, a cross-bar is welded to bolt (B) for leverage and lock-nut (E) threaded on before the bolt is screwed through anchor nut (C). Then assembly (D) is attached.

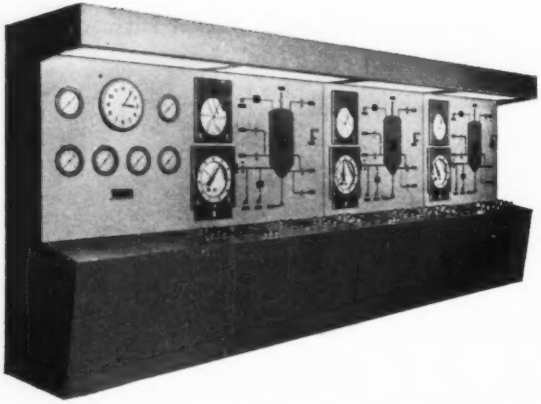
This is how the gage is used in our plant.

The first bucket is filled by weight or volumetric measure to the required amount, after which the disc is lowered to the surface of the liquid and held at the required level by tightening lock-nut (E). Subsequent fillings of other buckets to the disc level will result in uniform fills.—*F. T. Ogle, Plant Engineer, American Preserves Company, Philadelphia.*

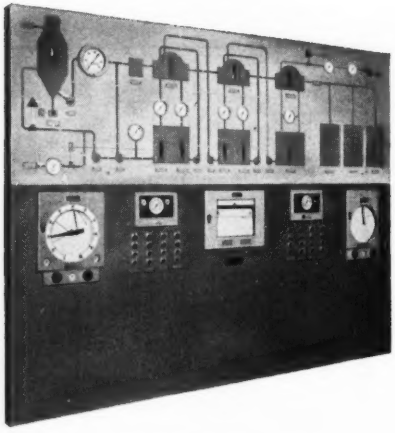


COMPLEX OIL REFINERY PROCESS *is controlled from this board which utilizes some 50* ***Tel-O-Set*** *recorders on the front of the panel, and an equal number of* ***Tel-O-Set*** *controllers mounted behind the panel. Multi-point* ***ElectroniK*** *instruments at left record additional process variables.*

Graphic Panels for Centralized Instrumentation...



CHEMICAL PLANT *panel combines the graphic theme with conventional size controlling instruments. It is built as a vapor-tight cubicle with a console front and overhanging light canopy.*



PAPER MILL *panel utilizes color to facilitate identification of process components . . . was designed by* ***Honeywell*** *engineers in close cooperation with the mill's engineers.*

PANEL PRODUCTION *in Honeywell's extensive shop devoted exclusively to panel work—utilizes the skills of highly trained specialists. All instruments, controllers, accessories, and back of panel wiring, and piping are carefully assembled—then subjected to rigorous tests to assure trouble-free installation and start-up when the panel reaches your plant.*

. . . *a progress report from Honeywell*

SHOWN here are just a few of the many graphic instrument panels which Honeywell has supplied for centralized control of a wide variety of industrial processes. Each one is the result of well-seasoned engineering know-how . . . based on extensive Honeywell experience . . . which combines all instruments and accessories into a closely integrated, efficient design.

Whether your process calls for a full graphic or semi-graphic panel . . . a conventional board . . . or a control cubicle . . . you can be sure of obtaining every feature of quality and performance that you need in a Honeywell panel.

In Honeywell's Panel Division, meticulous attention to engineering detail and highly developed construction techniques watch over every step—from blueprint to assembly to final test. Add to this engineering and manufacturing skill the availability of a complete line of conventional and miniature instruments, and the result is a control board . . . custom-fitted to *your* needs . . . that makes *Panels by Honeywell* synonymous with the best in centralized control.

Our local engineering representative will be glad to discuss how graphic panels by Honeywell can bring new efficiency to your processes. Call him today . . . he is as near as your phone.

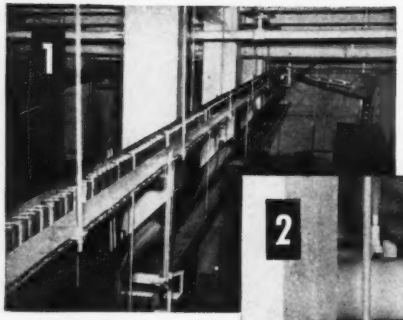
MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Penna.

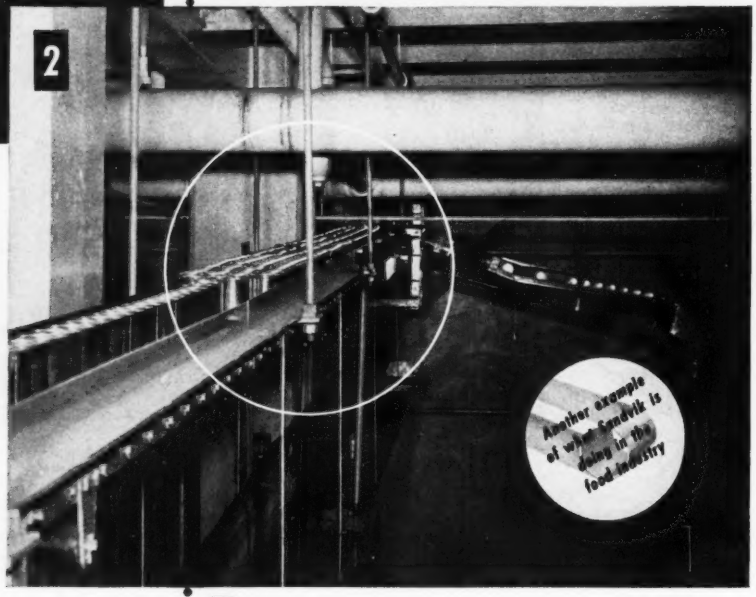
MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

● *Important Reference Data*

Write for your copy of Bulletin No. 85-20, "Centralized Instrumentation . . . unlimited."

Easier-Sliding Simplifies Can Handling On This SANDVIK STEEL-BELT CONVEYOR





1 Here are cans of Hershey's chocolate syrup carried by a Sandvik steel-belt conveyor. Normally, they move in single file to the take-off point.

2 But, when there's a delay . . . the cans keep coming, close ranks, form a column of four and mark time . . . with the smooth, Sandvik belt sliding easily under them until the take-off operation catches up. At times, there are four can columns, 60 feet long, marking time on the moving belt.

The smooth, low-friction surface of the solid steel band gives a Sandvik conveyor a special advantage for handling cans. They can be very easily slide-handled as they ride on the moving belt. This facilitates automatic storage en route and simple, slide-off discharge at any point with a minimum of belt wear. When extra "slide-ability" is required, the surface of the band can be lubricated.

SANDVIK STEEL BELT CONVEYORS

SS-71

Can You Improve Your Food Handling Operation With A Sandvik Steel-Belt Conveyor?

In addition to can conveyors, Sandvik supplies steel-belt units for handling a wide variety of foods, in various stages of preparation. These include meat, fish, vegetables, fruits, sugar, bakery products (on bake oven bands), margarine, candy, etc.

Why not look over your operation. See if there might be a place where the easy-to-keep sterile surface of a solid, stainless or carbon steel band could save money or step up production. Then, ask Sandvik for their engineering help and advice.

Sandvik builds complete conveyors to fit specific applications and provides engineering service to insure satisfactory operation. Belts can be of any length or width.

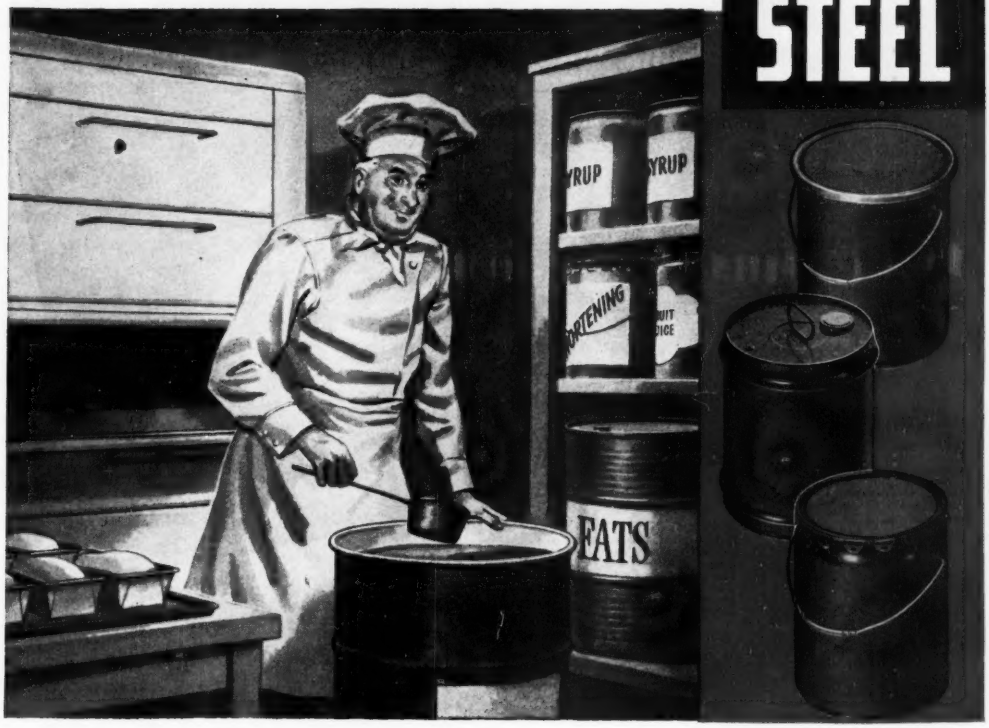
Write, wire or phone for further information.

SANDVIK STEEL, INC.
Conveyor Division
111 EIGHTH AVE., N. Y. 11, N. Y., WAtkins 9-7180
Manufacturers of steel-belt conveyors for over thirty years.

Let J & L Steel Drums and Pails

help Your Products Sell Themselves

J&L STEEL



Representative samples of J&L's complete line of steel shipping pails showing (top to bottom) the ring seal, closed head and lug covers.

Your quality product and a J&L container are a combination that you can be doubly sure will catch the customer's eye. Besides affording maximum protection against damage or contamination, J&L Steel Drums and Pails offer an opportunity to add measurably to the sales appeal of your product. Our artists are at your disposal to assist you in creating a distinctive, decorative package.

We can provide all types of Closures, Finishes and Decorations

Heavy-duty ICC Drums	Light-gage Drums 55, 30 and 15 gal. capacity and 100-lb. Drums	Lightweight Drums for Chemical and Powdered materials	Steel Pails for Foods, Chemicals Oils—1-10 gal. cap.

Why not write for a free copy of our booklet "It's Safer to Ship in Steel." It will give you important information on J&L Steel Pails and Drums.

JONES & LAUGHLIN STEEL CORPORATION

CONTAINER DIVISION

CHRYSLER BUILDING

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PLANTS: Bayonne, N. J. • Cleveland, Ohio • Philadelphia, Pa. • New Orleans, La. • Kansas City, Kan. • Atlanta, Ga. • West Port Arthur, Texas • Toledo, Ohio

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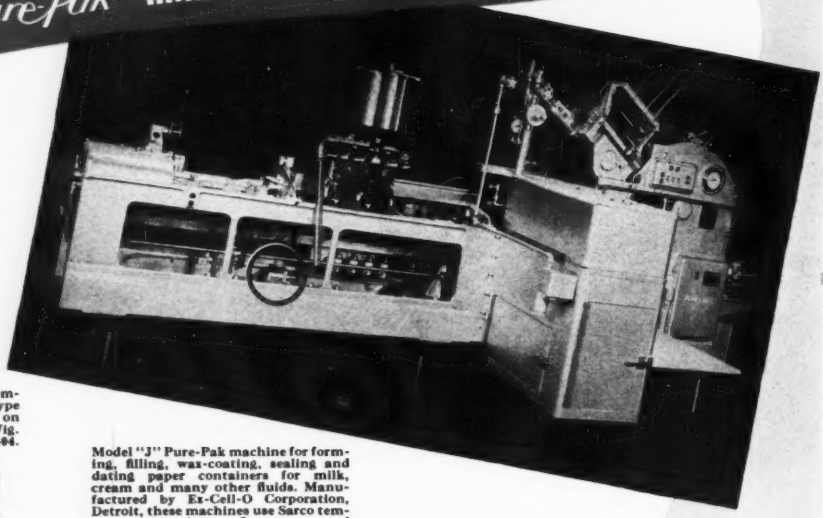
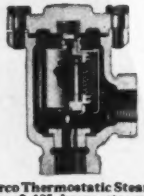
SARCO HELPS

make and fill ten million *Pure-Pak** milk containers a day...



Model "J" Pure-Pak machine for forming, filling, wax-coating, sealing and dating paper containers for milk, cream and many other fluids. Manufactured by Ex-Cell-O Corporation, Detroit, these machines use Sarco temperature regulators, float traps, and strainers.

Sarco self-operated Temperature Regulator, type TR-19, is standard on these machines. See Fig. 1 below. Catalog No. 604.



Sarco Thermostatic Steam Trap, type 9-125 keeps steam jacket around wax tank free from air and condensate. High capacity in small space also used on preheater and line drips. Bulletin No. 255.

Regulator and trap valves are kept free of dirt and scale by Sarco Strainers. Bulletin 1201.

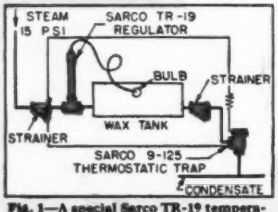


Fig. 1—A special Sarco TR-19 temperature regulator on the steam supply, working with a Sarco No. 9-125 thermostatic trap on the condensate discharge from the jacket, assure wax at just the right temperature.

* "Pure-Pak" is the registered trade-mark of Ex-Cell-O Corporation.

Sarco float-thermostatic trap assures a continuous supply of absolutely dry steam to the defoamer nozzle. See Fig. 2 below. Bulletin No. 452.

Sarco's contribution to this outstanding achievement is to provide *the right combination* of steam trapping and temperature control to assure smooth, automatic operation at top efficiency. If your process involves a heating or cooling problem, Sarco can help you.

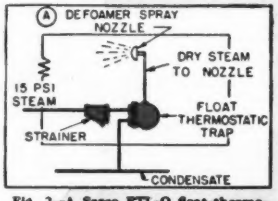


Fig. 2—A Sarco FTL-O float-thermostatic steam trap guarantees dry steam to the defoamer nozzle.

349

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SARCO CANADA LTD., TORONTO 5, ONTARIO

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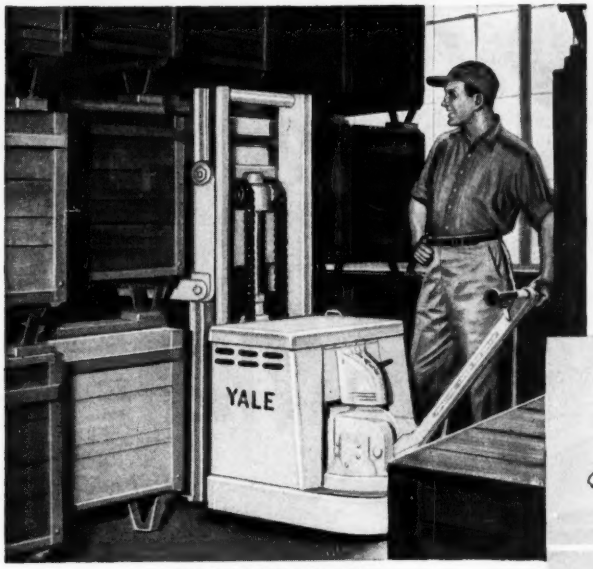
YALE WORKSAVERS



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SOLVE Time-Space Problems!

Move loads into and out of *any* storage or production area – easily and efficiently – with YALE ELECTRIC WORKSAVERS, industry's leading *powered* hand trucks!

SOLVE Manpower Problems!

Practically any man in your plant – picked at random – can transport, lift and stack multi-ton loads, safely, surely, smoothly – with a YALE ELECTRIC WORKSAVER!

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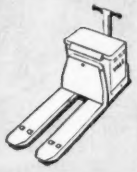
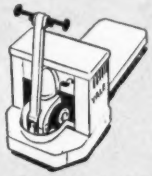
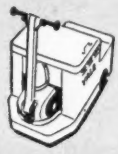
YALE ELECTRIC WORKSAVERS are low in initial cost, economical to maintain, operated easily by anyone. The money-saving answer to your handling problems!



PALLET WORKSAVER



PLATFORM WORKSAVER



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HIGH-LIFT FORK WORKSAVER

YALE WORKSAVER ELECTRIC HYDRAULIC POWERED HAND TRUCKS move right in—where big trucks are too big to fit—or too heavy for your floors. Yet they give you all the big-truck advantages...at far less cost: power travel—forward and reverse...power hydraulic lift...speed...everything! That's why, where size and weight make big trucks impractical, industry prefers YALE WORKSAVERS. Powered by economical electric power—they're your answer to countless materials handling problems in every plant or factory.

You'll Be Amazed By a Demonstration in Your Own Plant or Warehouse!

See it move about—lifting, transporting—through narrow doors, into elevators, and freight cars, over "low-load" floors. See how it saves you time and money. Ask your Yale Representative! He'll arrange a WORKSAVER demonstration in *your* plant. No obligation, of course!

There's a Yale Worksaver to meet your every need!

Yale is a registered trade mark of The Yale & Towne Mfg. Co.

The Yale & Towne Mfg. Co., Philadelphia 15, Pa.

YALE
MATERIALS HANDLING EQUIPMENT

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Cutting costs with YALE WORKSAVERS interests me, too.

☐ Please have your local Representative call on me.

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Lady—
put away
those tools!
That's a
High Speed Application?... You Bet!
This machine gives packers something never before offered in any equipment . . . VACUUM SEALING WITH LUG CAPS. Fast and completely automatic in operation, the Cem Vacuum Lug Capper provides important advantages in production. It gives sure, dependable lug capping on a wide range of jar sizes, cap sizes and products. Changing from one size to another is easy . . . can be done in a matter of minutes.
CEM VACUUM LUG CAPPER

When you seal your products with Crown Vacuum Lug Caps you're using the closure that housewives welcome with open arms. It gives them dependable hermetic sealing plus the convenience they've been longing for . . . easy removal. Prying and digging are things of the past. Just a simple, one-quarter turn and this cap is off . . . it's as easy as that.

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CROWN VACUUM LUG CAP

We would like an opportunity to tell you more about this cap that is revolutionizing vacuum packing and the new high speed capper that puts them on automatically. It's a story that should interest you whether you're ready to buy right now or not. Phone, wire or write us. There is absolutely no obligation.

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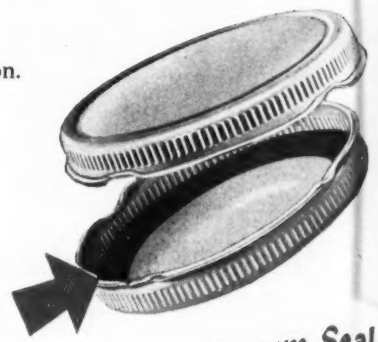

The Vacuum Seal with Sales Appeal

Patented SLIP RUBBER RING—

This is no ordinary rubber ring. It was perfected through considerable research and development to serve this single purpose . . . hermetic sealing, and to do it far better than any other ring on the market.

These rings contain a special lubricant which prevents them from drying out or sticking to the glass. They stay soft and pliable. They're cut extra thick, too . . . seal off any slight irregularities in the surface of the jar . . . will not cut through . . . and they will not fall out during transit, during application or when the cap is removed from the jar.

A Star Quartet of Economical, Sales-Building Packages for Your Products

Bemis Deltaseal®

—This long-time favorite has exclusive pull-cut-pour spout. Billboards your brand . . . and flat tops and bottoms help build excellent mass displays.

Bemis Deltaphane®

—If your trade prefers a window package, Bemis Deltaphane, with the "picture window," is your best bet. Your brand in crisp, bright colors on all four sides. Has the pull-cut-pour top, too.

Bemis Cellophane

—There's an increasing demand for the *show window* bags—Bemis Cellophane. Bemis' bright, eye-catching printing makes your brand shine like a headlight.

Bemis Flexi-Carton®

—Sturdy, gusseted bag, single-, 2- or 3-ply. A fine shelf package, with your brand printed on all sides. Closures: sewing, taping, stapling, pasting.

Here's another bonus for you . . . Bemis Deltaseal Packaging System *closes all of these types* of bags (except Flexi-Carton), so you can meet the varied demands of your trade. Deltaseal Packaging System is the most economical packaging operation for you . . . *proof on request.*

Bemis is also your best source for Burlap, Cotton, Multiwall, Paper and Waterproof Bags. Ask your Bemis Man for the complete story.

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JENKINS PRACTICAL PIPING LAYOUTS 62

SCHEDULE OF VALVE POSITIONS FOR COMPLETE CYCLE OF OPERATION

Operation	A	B	C	D	E	F	G	H
Softening	Open	Open	Close	Close	Close	Close	Close	Open
Backwashing	Open	Close	Open	Open	Close	Close	Close	Close
Brining	Open	Close	Close	Close	Open	Open	Open	Close
Rinsing	Open	Open	Close	Close	Close	Close	Open	Close

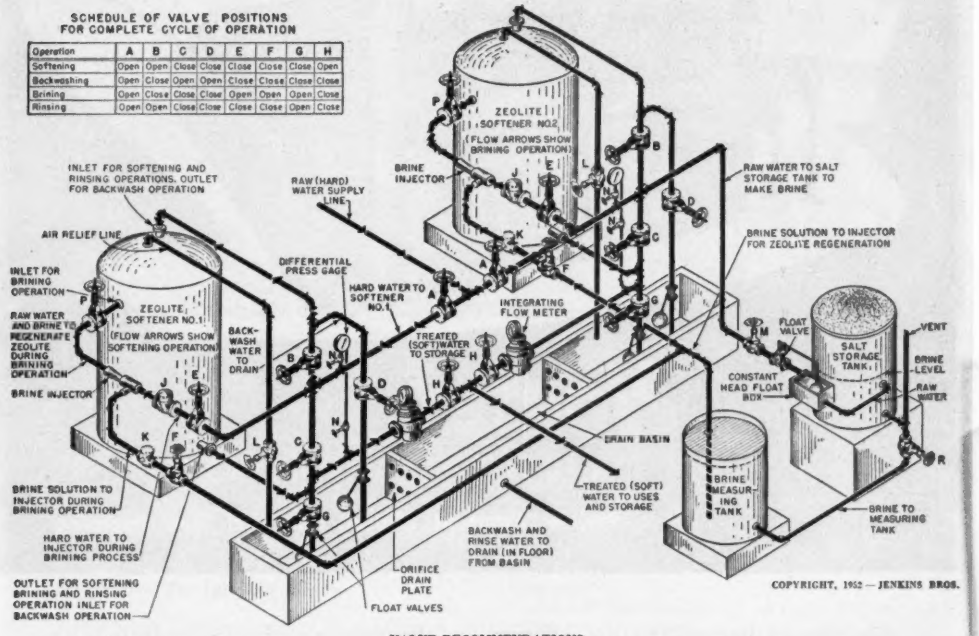

ZEOLITE SOFTENER NO.2 (FLOW ARROWS SHOW BRINING OPERATION)
INLET FOR SOFTENING AND RINSING OPERATIONS. OUTLET FOR BACKWASH OPERATION
RAW (HARD) WATER SUPPLY LINE
BRINE INJECTOR
RAW WATER TO SALT STORAGE TANK TO MAKE BRINE
BRINE SOLUTION TO INJECTOR FOR ZEOLITE REGENERATION
AIR RELIEF LINE
DIFFERENTIAL PRESS GAGE
INLET FOR BRINING OPERATION
HARD WATER TO SOFTENER NO.1
INTEGRATING FLOW METER
ZEOLITE, SOFTENER NO.1 (FLOW ARROWS SHOW SOFTENING OPERATION)
RAW WATER AND BRINE TO REGENERATE ZEOLITE DURING BRINING OPERATION
BACK-WASH WATER TO DRAIN
TREATED (SOFT) WATER TO STORAGE
FLOAT VALVE
VENT
SALT STORAGE TANK
BRINE LEVEL
RAW WATER
CONSTANT HEAD FLOAT BOX
BRINE INJECTOR
DRAIN BASIN
TREATED (SOFT) WATER TO USES AND STORAGE
BRINE MEASURING TANK
BRINE TO MEASURING TANK
BRINE SOLUTION TO INJECTOR DURING BRINING OPERATION
HARD WATER TO INJECTOR DURING BRINING PROCESS
BACKWASH AND RINSE WATER TO DRAIN (IN FLOOR) FROM BASIN
ORIFICE DRAIN PLATE
OUTLET FOR SOFTENING BRINING AND RINSING OPERATION INLET FOR BACKWASH OPERATION
FLOAT VALVES
COPYRIGHT, 1952 — JENKINS BROS.

Diagram by Huxley Madeheim Consulting Engineer

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions, see Jenkins Catalog

Code	Quan.	JENKINS VALVES	SERVICE
A	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Raw Water Supply to Softener
B	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Control of Cycle Operations
C	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Control of Cycle Operations
D	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Backwash Drain Line
E	2	Fig. 100 All Iron Gate	Injector Water Shutoff
F	2	Fig. 40-A All Iron Gate	Brine Control to Injector
G	2	Fig. 651 I.B.B.M. Gate	Brine and Rinsing Operation Drain
H	2	Fig. 651 I.B.B.M. Gate	Softened Water Shutoff
J	2	Fig. 624 I.B. Swing Check or Fig. 85 All Iron Swing Gate	Prevent Backflow
K	2	Fig. 623 I.B. Swing Check or Fig. 85 All Iron Swing Gate	Prevent Backflow
L	2	Fig. 106-A Bronze Globe	Air Release
M	1	Fig. 106-A Bronze Globe	Water Supply for Brine
N	4	Fig. 743-G Bronze Needle	Pressure Gage Control
P	2	Fig. 100 All Iron Gate	Brine Connection Shutoff at Softener
R	1	Fig. 40-A All Iron Gate	Brine to Measuring Tank

How to plan a ZEOLITE (BASE EXCHANGE) WATER SOFTENING SYSTEM

Diagram shows piping connections for a zeolite water softening system (removal of hard water impurities). Twin softening units permit one to operate while the other is being regenerated, (replacing used sodium in the zeolite).

The complete cycle consists of softening, backwashing, brining, and rinsing. After a certain amount of raw water has been softened, the sodium in the zeolite is used up. The process is then stopped by operating the valves as indicated in the schedule, and the other softening unit is put into operation.

The zeolite is regenerated, after the backwash operation (first step in regeneration of softener), by replacing accumulated calcium and magnesium with the sodium by running through a brine solution. The zeolite is then rinsed after correct amount of brine solution has been admitted.

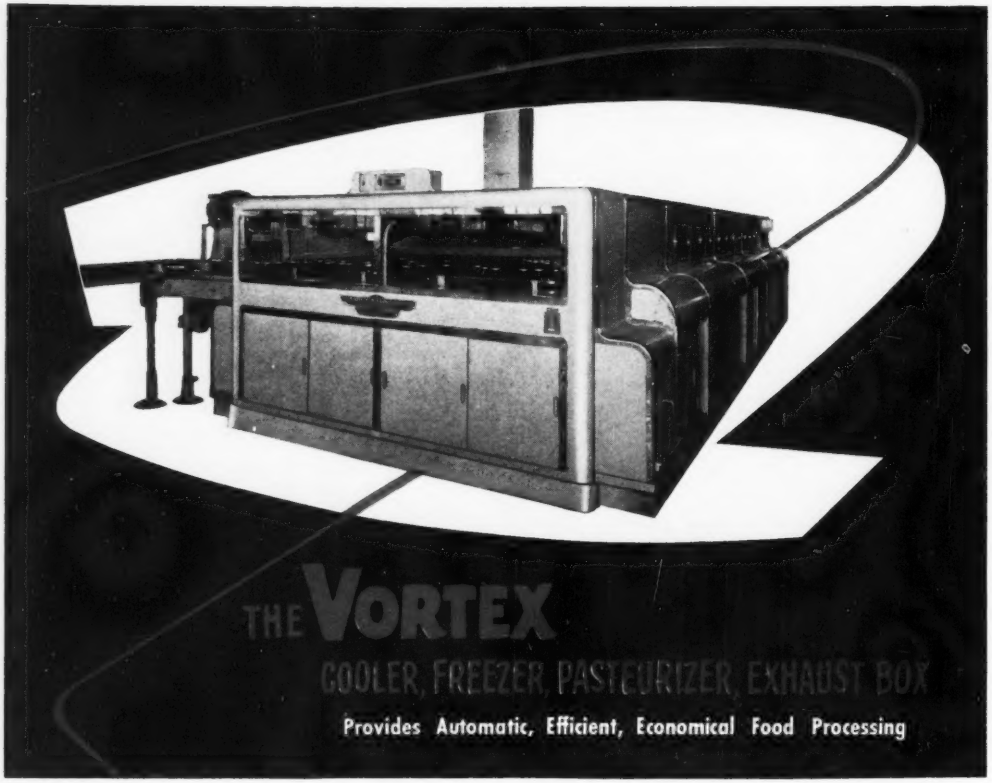
The rinsing operation also removes any remaining brine, making the softener ready for re-use when needed. Depending upon the chemical composition of the water, either iron-body bronze-mounted or all-iron valves are recommended on all lines conducting the water before it is completely treated.

Consultation with piping engineers is recommended when planning any major piping installations.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from Jenkins complete line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 62.

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864
Jenkins Bros



The famous Barry-Wehmiller "Vortex" machine is being successfully used by more and more food processors in a wide variety of applications. Whether *your* processing requirements include cooling, freezing, pasteurizing, or exhausting, you'll find the Vortex perfectly adapted to glass or metal for food or beverage containers.

Operation of the "Vortex" is entirely automatic and continuous. Accurate dial control of speed assures correct processing time. Compact design conserves valuable floor space.

Engineering advantages include the patented "walking beam" conveyor which moves containers through processing zones, yet the conveyor itself remains at the same temperature throughout the processing operation. This eliminates the usual cost of heating, cooling or reheating the conveyor system. Hydraulic drive eliminates many gears and cam movements. Power requirements are low.

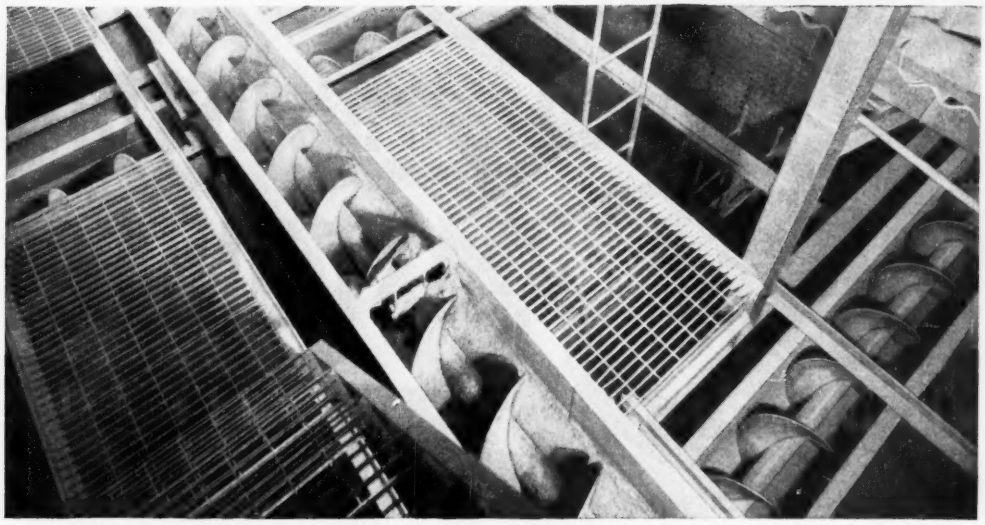
For years of the most efficient, economical processing, specify the "Vortex" for your plant. Write for complete data today.

THE SUN NEVER SETS ON BW BOTTLE CLEANERS PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE · ST. LOUIS 15, MO.

IN GREAT BRITAIN BW BARRY-WEHMILLER MACHINERY CO. LTD. MILL GREEN ROAD MITCHAM JUNCTION, SURREY, ENGLAND



This Link-Belt 12-inch screw conveyor delivers screened mixed material to four 12-inch diameter reversible screw conveyors. These distribute to 16 raw-material storage bins through a series of discharge gates and chutes.

There's no substitute for "total engineering" in screw conveyors

LINK-BELT integrates all components to give you the right screw conveyor for your job

HERE'S how "total engineering" works for you when you buy Link-Belt Screw Conveyors.

First, conveying specialists analyze your problem. Then, Link-Belt's vast experience in design and manufacture is at your command to recommend the screw conveyor—or system of conveyors—for your particular requirements. The right components are then selected from Link-Belt's complete range of types and sizes.

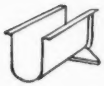
Link-Belt "total engineering" on your screw conveyors is your assurance of efficient design . . . balanced performance.

To benefit from Link-Belt's materials handling experience and engineering service, contact the Link-Belt office near you.

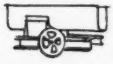
LINK-BELT designs and builds all components

SCREWS—Link-Belt makes a complete range of conveyor screws—Helicoid, Sectional Flight, Cut Flight, Ribbon Flight, Paddle type and other special types for such diverse applications as feeding, conveying, mixing, agitating, stirring, blending, etc.

HANGERS—Available in a variety of styles and mountings, with various bearing materials and steel or cast hanger frames.



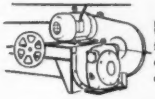
TROUGHS—Link-Belt builds flanged, angle flanged, flared, rectangular, dust-seal, jacketed and drop-bottom types in steel or alloy metals. Variety of connections, supports, covers and clamps offers added design flexibility.



SPOUTS & GATES—Plain discharge spouts can be fixed or detachable. Discharge gates, flat or curved slide, can be hand or rack-and-pinion operated.

SHAFTS & COUPLINGS — Conveyor couplings and end shafts are designed for adequate torsional strength and have jig-drilled coupling bolt holes for accurate alignment.

TROUGH ENDS—Steel or alloy metal plate or cast trough ends to match all trough shapes, provide required shaft bearing support and alignment. Seal glands to protect bearings, if required.



DRIVES — Link-Belt designs and builds many forms of drives to suit specific conditions—Enclosed gear, Electrofluid, P.I.V. variable speed, and chain drives of various types.

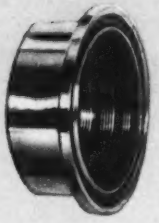
LINK-BELT

SCREW CONVEYORS 12,864

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities.

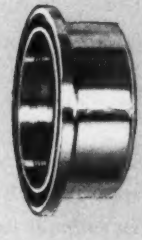
...here is STAINLESS

...The FASTEST, SIMPLEST, MOST ECONOMICAL METHOD of Sanitary Line Installation ever developed



TRI-CLAMP recessless ferrule, showing grooved lip to receive molded gasket. Note inner finish which provides positive, leak-tight joint.

Special precision molded Hycar gasket provides equal pressure around joint, giving smooth, unobstructed liquid flow.

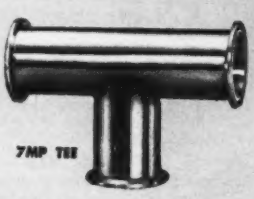


TRI-CLAMP snap-action spring clamp, with toggle locking device securely attached. Forms fast, positive joint *at a flick of the wrist.*

AVAILABLE IN A FULL SANITARY LINE

TRI-CLAMP FITTINGS and VALVES ARE AVAILABLE IN ALL STANDARD SANITARY TYPES—IN 1½", 2", 2½", 3" and 4" SIZES. *(Shown below are four typical Tri-Clamp fitting types).*

2CMP 90° ELL



7MP TEE

9MP CROSS

11CPLMP THREE-WAY LIFT PLUG VALVE... Incorporating latest Tri-Clover non-galling lift plug design

FOR BOTH PERMANENT "C-I-P" AND TAKE-DOWN LINES

Below is the special clamp for use with TRI-CLAMP fittings for permanent "Cleaned-In-Place" lines . . . a short toggle clamp which can only be opened through the use of a specially-designed hand tool. This prevents accidental opening or tampering with joints in "C-I-P" sanitary lines and provides a visible means of distinguishing between a "take-down" and "permanent" joint.

the all-new TRI-CLAMP STEEL FITTINGS LINE!

The TRI-CLAMP line gives you all these features:

- SAVES LABOR . . . up to 60% saving in cleaning time.
- LOWER INITIAL INVESTMENT COST.
- SANITARY . . . flush joints, with smooth, non-toxic, fat-resistant gaskets, held under even pressure and tension.
- FASTER INSTALLATION and TAKE-DOWN . . . *at a flick of the wrist.*
- LONGER LIFE . . . unions open easily — no hammering needed — no threads to batter.
- INCREASED EFFICIENCY . . . increased installation and maintenance efficiency.
- ADAPTABLE TO OTHER FITTINGS . . . through use of simple adapters.
- STANDARD TOOLS CAN BE USED . . . some Super Speed Tools used for expanding except for die block and facing tool.
- AVAILABLE NOW . . . in a complete line of valves and fittings, expanding and welding type ferrules, pumps, and specialties.

Write for CATALOG 1-152

This new catalog, just off the press, gives complete data on the Tri-Clamp Stainless Steel Fittings Line. Write for your copy today.

● *TRI-CLOVER*—the leader in the design and fabrication of quality sanitary fittings for over 30 years—now presents TRI-CLAMP Fittings . . . an entirely new concept of sanitary fitting design and fabrication, offering much greater speed and ease of installation, together with appreciable savings in original investment cost, and longer, trouble-free fitting life.

WHAT IT IS: The TRI-CLAMP Joint consists of a flange type ferrule—a special precision molded Hycar Gasket which fits into the grooved ferrule lip—and the TRI-CLAMP itself, which is composed of a specially fabricated spring clamp which grips the ferrule edges, and a simple, snap-action toggle assembly firmly secured to the clamp ring . . . always in position for instant assembly or disassembly.

HOW IT WORKS: All that is necessary for installation is to attach the ferrules to the sanitary tubing, insert gasket into position, slip TRI-CLAMP over ferrules and gasket and snap into closed position. Thus, *at a flick of the wrist,* you have completed a positive, sanitary leak-tight joint.

SAVINGS: When used in either "take down" or "C-I-P" installations, substantial savings have been made in initial material cost per joint over conventional union nut ferrule assemblies. When cleaned in place the cost of cleaning has been reduced as much as 60% by use of TRI-CLAMP stainless steel fittings.

SIZE RANGE: The new TRI-CLAMP series is available in the full line of Standard Sanitary Type fittings and valves, for both "permanent" and "take-down" sanitary lines, in 1½″, 2″, 2½″, 3″, and 4″ sizes, all fabricated from type 304 stainless steel . . . offering highest quality material and workmanship.

For full details, see your nearest Tri-Clover Distributor or write for Catalog 1-152. 5352

See the New TRI-CLAMP Line at the Dairy Show
Chicago — Booth C-22

EXPORT DIVISION — 8 So. Michigan Ave. — CHICAGO 3, U.S.A.

Tri-Clover®
MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

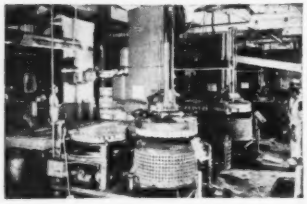
FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

(ADVERTISEMENT)

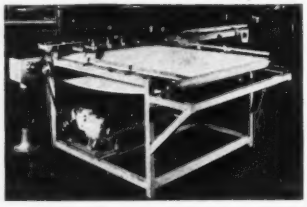
TIME and MONEY SAVING EQUIPMENT FOR THE FOOD PACKER

Three of our many installations, which have proven profitable to food packers, are illustrated and described below. These are offered as examples of the results of our work in collaboration with food packers and on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.



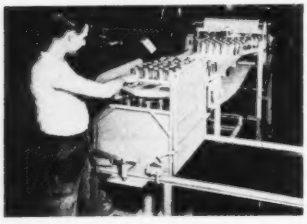
Load 500 Jars Per Minute

This Barnes retort crate loader handles 500 baby food jars per minute. It is one of many different machines designed and manufactured by Barnes to help the food packer lower costs, speed up handling, and minimize breakage.



Unscramble 500 Jars Per Minute with Barnes Single Filer

Here's a new, efficient method of unscrambling empty jars. The illustration shows operating end of machine where girls are positioned while dumping cases of glass onto the receiving conveyor belt. Jars are discharged to conveyor at the rate of 500 to 600 per minute, determined by size and shape.



Unload Over 600 Cans Per Minute with Barnes Packaged Can Unloader

This new dual purpose machine can be operated with only two men in continuous production while unloading 3 to 4 bags of cans per minute. The Barnes unloader handles 3 bags, each containing 265 No. 303 cans per minute, or 795 cans.

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for bulletin E652.

W. F. & JOHN BARNES

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 320 SOUTH WATER STREET, ROCKFORD, ILLINOIS

City Health Department Investigates Martin Aseptic Canning of Fresh Whole Milk

The population of Rockford, Illinois is approximately 100,000. The daily consumption of whole milk approximates 57,000 quarts. Recently, the Rockford City health department made a local sanitary field study of the Martin Method of Aseptically canning milk and milk products. This was done in anticipation of the possibility of one or more Martin Aseptic canning units being installed in the Rockford Metropolitan area.

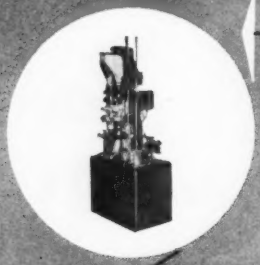
Find Finished Product of "Good Flavor, Color, Texture, and Good-Keeping Quality"

Among the many features found in the summary of the Rockford Health Department Report are those of commercial value as we have stressed in this column previously. From a public health standpoint they report: "Clinical laboratory test results apparently reveal that the Martin Method of Aseptically canning sterilized milk and milk products in sealed containers can meet acceptable public health standards of sanitation."

Only Two Units Required to Serve City of 100,000

Only two Martin Aseptic canning units would be necessary to handle the daily demand for fresh milk in Rockford. For further information on this interesting system write to W. F. and John Barnes Co., Process Equipment Division, 301 South Water Street, Rockford, Illinois.

CORROSION affects
every plant in the Food Industry
MILLIONS OF DOLLARS ARE LOST ANNUALLY
1 Your Hard-to-Get Equipment
. . . may be ruined by constant attack of acids, alkalies, fumes, chemicals, moisture, gases and weathering.
2 Your Valuable Products
. . . are subject to contamination and loss whenever they are in contact with corroded surfaces.
3 Expensive Shutdowns
. . . and loss of production with costly man-hours for repairs may be incurred unnecessarily.
4 Your Profits
Ruined equipment, contaminated products, the loss of production and repair expense caused by shutdowns mean only one thing . . . reduction in *your* profits!
RIGHT NOW . . . you should investigate the economies of using Amercoat; a *line* of coatings built to protect against *specific* industrial corrosion hazards.
Our field engineers are available . . . without obligation . . . to check your plant for corrosion problems . . . and to give you *specific* recommendations.
AMERCOAT CORPORATION

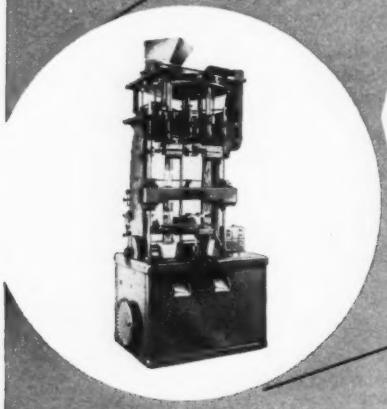


MODEL "A"

For smaller quantities at high production rates.

PRODUCTS:	Liquids, tablets, granuals, powders.
FEEDS:	Volumetric, Auger, Liquid.
MATERIALS:	Cellophane, Polyethylene, Glassine, Coated Kraft, Pliofilm and others.
SIZES:	1¼" x 1½" to 2⅜" x 6½".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Average — to 150/min.
EXTRAS:	Gas fill, counter, dating, photo-registry, Strip Seal for lamination.

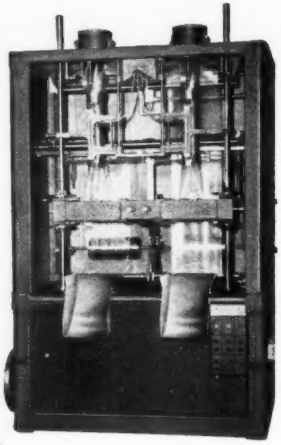
TRANSWRAPS — INCREASE YOUR PROFITS * with "One-Step"



MODEL "B"

Work horse of Flexible Packaging — for most jobs.

PRODUCTS:	Candies, nuts, syrups, sugar, rice, pills, crackers, tidbits, marbles and like products.
FEEDS:	Volumetric, Auger, Liquid, Net Weight.
MATERIALS:	Foil, Cellophane, Polyethylene, Pliofilm, Vinyl, Saran, Laminations, Kraft and others.
SIZES:	2½" square to 5" x 6".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Average — to 100/min. Double — to 240/min.
EXTRAS:	Gas fill, counter, photo-registry, Strip Seal for pillow with laminations, printing attachment.



MODEL "C"

Hydraulically operated — for larger size packages.

PRODUCTS:	Dried fruits, nuts, candies, chips, crackers, minced products, powders and many others.
FEEDS:	Volumetric, Auger, Liquid, Net Weight.
MATERIALS:	Foil, Cellophane, Polyethylene, Pliofilm, Saran, Kraft and other heat-sealers.
SIZES:	Up to 9½" x 13½".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Up to 60/min.
EXTRAS:	Gas fill, counter, photo-registry, Strip Seal attachment, printing attachment.

* Forming, filling, sealing in one operation . . . from rolled stock.

Saves material costs
Reduces labor costs
Increases production

TRANSPARENT WRAP MACHINE CORPORATION

ROUTE 17 & HENRY STREET • HASBROUCK HEIGHTS, NEW JERSEY

Switch to TIMKEN® bearings in packaging machine eliminates bearing failures

BEARINGS formerly used in the worm shafts and worm gear shafts of this Anderson Bros. packaging machine failed repeatedly when put to the task of packaging 100 pints of ice cream per minute. Accurate clutch adjustment was impossible. Production was held up. Repair costs were high.

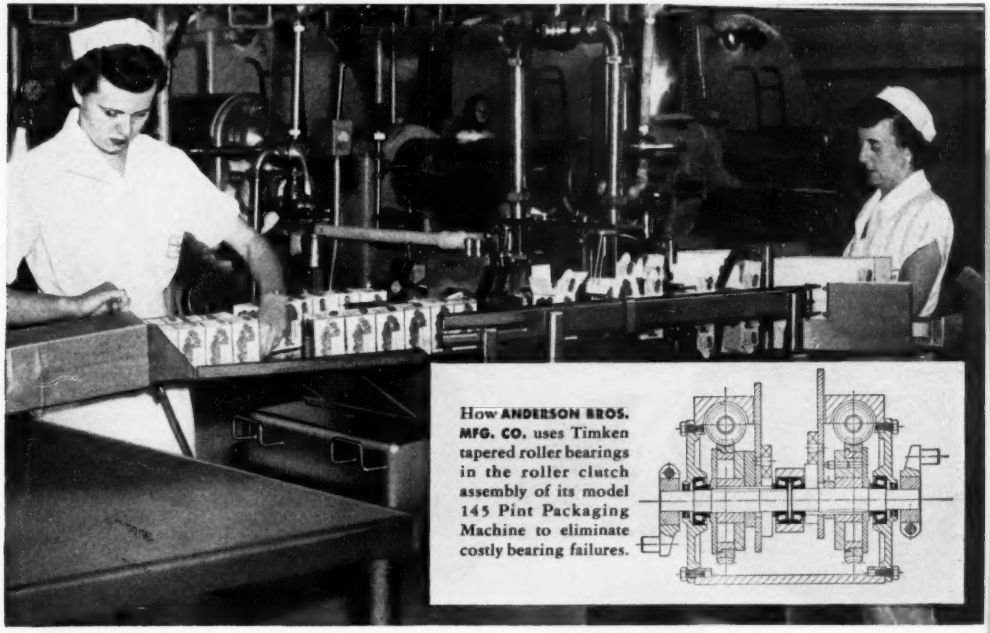
Anderson engineers, in search of more dependable bearings, turned to Timken® tapered roller bearings. And this is what chief engineer, W. E. Gunnerson, has to say about their performance: "When we have a tough job, we use Timken bearings."

Timken bearings in worm gear applications keep gears meshing smoothly and accurately, minimizing wear. Radial and thrust loads are carried in any combination, due to tapered construction.

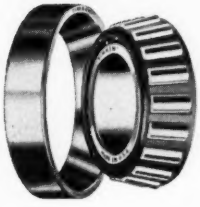
Because Timken bearings hold shafts and housings concentric, closures are more effective; keeping lubricant in, dirt and dust out. Friction is practically eliminated with Timken bearings because of their true rolling motion and incredibly smooth surface finish.

No other bearing can offer you all the advantages of Timken bearings. They're your best assurance of long life and dependable performance in the machines you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **ANDERSON BROS. MFG. CO.** uses Timken tapered roller bearings in the roller clutch assembly of its model 145 Pint Packaging Machine to eliminate costly bearing failures.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

FINISHED TO CLOSER TOLERANCES

Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↓ AND THRUST →○← LOADS OR ANY COMBINATION

(This advertisement originally appeared in full-color in TIME, BUSINESS WEEK and FORTUNE.)

SERVING INDUSTRY
. . . SERVING AMERICA

You are always close to Continental Can with its 65 plants in the United States, Canada and Cuba, 17 field research laboratories and 63 sales offices.

TODAY'S AMERICANS EAT BETTER THAN YESTERDAY'S ROYALTY

"To eat like a king" may have seemed the height of good living to the people of past generations. But we're pretty certain that many a king of bygone days would have been delighted to swap his table for that of today's Mr. Average American.

The royal cooks had to stick pretty closely to what was in season. Today's housewife, by simply opening a can, is able to serve fruits and vegetables that are months out of season. His Majesty could have his choice of a few salted and preserved foods—but there just wasn't a chance of a midwinter meal including such foods as asparagus, spinach, peaches, pears, cherries or pineapple.

Even more dramatic is a comparison of the monotonous salt meat, bean, bread and potato diet of the king's subjects with the tremendous variety that canned foods bring to the table of today's average American.

The American people are today enjoying the highest level of public health in history—and one of the very important reasons for this is *good nutrition,* to which canned foods contribute greatly. Consumers may rely upon canned foods as important sources of essential nutrients—representative of the raw foods from which they are prepared. And because canned foods are relatively inexpensive for the food values they offer, families at all levels of the American economic scale have a source of wholesome and nutritious diets.

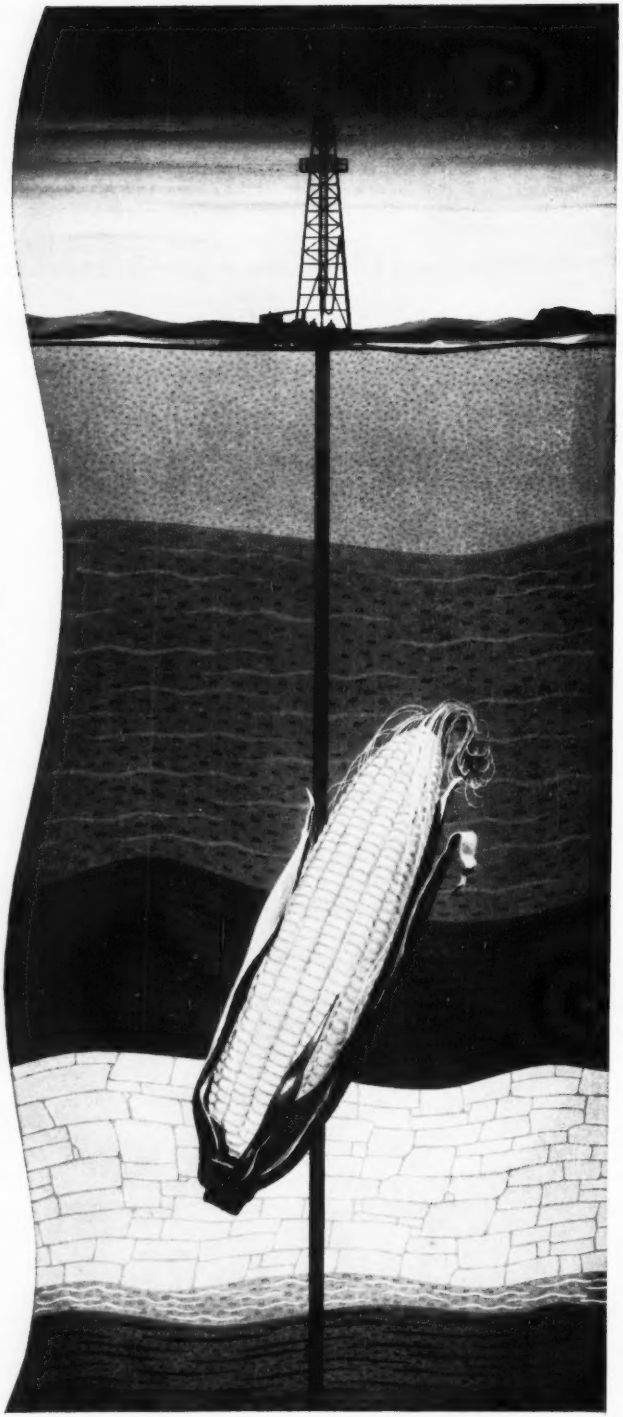
To make possible this miracle of canned foods requires millions and millions of cans each year. Today everybody at Continental realizes that the job of maintaining a dependable source of containers is vital to our nation's welfare... and we will do our utmost to meet every demand in the difficult days ahead.

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING

100 E. 42nd ST., NEW YORK 17, N. Y.

What's corn doing "deep in the heart of Texas"?



Research discovered that drilling for oil could be expedited by the use of a binding agent made of a product of corn. This firmed up the side walls . . . also aided in the early flow of sludge. "Black gold" speeded by yellow corn! This is but one of the numerous examples of how continuous basic research in corn helps American industry . . . helps you.

Corn products in food

In the food field highest quality dextrose, regular and high-conversion corn syrups and superior starches are recommended ingredients for many processing formulas. New techniques involving the use of corn products are being developed as part of a continuing research program at Corn Products Refining Company.

If you have a production problem why not check with Corn Products? A complete line of corn products for every purpose is available. Technical service is yours . . . no obligation, of course.

CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

Manufacturers of

CERELOSE brand dextrose • **PURITOSE** brand corn syrup • **GLOBE** brand corn syrup
BUFFALO starch • **HUDSON RIVER** starch

Another Leading Oil Company now using

RHEEMCOTE POSTER DRUMS

From one quart to 55 gallons — Sinclair gets distinctive design on all containers

Sinclair, too, realizes the sales value of colorful, attention-demanding containers. Like many others, they are now shipping petroleum products in 55-gallon Rheemcote Poster Drums like the one shown here.

Rheemcote containers can be lithographed in any number of colors, any design, including halftones. The high-gloss finish is tough, long-lasting. When necessary, interiors can be roller-coated with special protective lacquers.

If your product is shipped in steel containers, let Rheem show you the way to added prestige and profit ... with Rheemcote Poster Drums.

RHEEM MANUFACTURING COMPANY

General Sales Offices
570 Lexington Ave.
New York 22, N. Y.

SELL AS YOU SHIP WITH Rheemcote DRUMS

Rheem Manufacturing Plants In 22 Cities Around The World —

Plants and offices: Burlington, Linden, New Jersey • Chicago, Ill. • Houston, Texas • New Orleans, La. • New York, N. Y. • Newark, Richmond, San Francisco, San Pablo, South Gate, Calif.; Sparrows Point, Md. • Foreign Plants: Brisbane, Fremantle, Melbourne, Sydney, Australia • Bristol, United Kingdom • Buenos Aires, Argentina • Hamilton, Ontario • Lima, Peru • Rio De Janeiro, Brazil • Milan, Italy • Singapore

© 1952 RHEEM MFG. CO.

"Gets clearer juice from press by using CELITE"

From a CELITE Field Engineer's report on jelly making

"IT TOOK only one trial run to convince this customer that he had a lot to gain by using Celite* Pressing Aids in making jelly from frozen grapes. Judging from the clarity of the jelly when Celite was used—a considerably longer storage life could be expected. And because of this clarity, the jelly had far more sales appeal."

• • •

Unusual clarity is one of several economic advantages that are causing more and more fruit processors to use Celite Pressing Aids. Faster production, clearer juice, higher yields, less wear and tear on cloths and equipment are some of the important benefits obtained when these diatomite powders are added in small amounts to the pulp before pressing.

HOW CELITE PRESSING AIDS WORK

The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter. This opens up countless minute channels through which the juice can escape, freely and at lower pressure. More juice is thus extracted in less time. The drier cake is more easily removed and the cloths can usually be re-used without washing.

Celite Pressing Aids are used with practically all types of fruit products. No special equipment is needed and the benefits they assure will usually more than pay for the small amounts of powder required.

IF YOU FILTER

Celite Filter Aids can bring you corresponding benefits in faster production, sparklingly clear juices, longer filtration cycles. They are available in 9 grades of particle fineness, each designed for a specific filtering requirement. A Celite Engineer will be glad to give you all the facts.

*Reg. U. S. Pat. Off.

For further information, write Johns-Manville, Box 60, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville CELITE

PRESSING AND FILTER AIDS

Protective sales maker!

Cheese makers across the country use Marathon's transparent, specially coated Parakote for positive protection. It meets every recommended specification for a quality wrapper. Parakote gives clean, smooth eye appeal to natural cheeses packed in wedges, squares and slices.

Here's an important point about Parakote. Your cheese reaches the home in the same physical condition as when cut up in your plant. No change whatsoever in flavor or texture. It is perfectly protected. Step up the eye appeal, appetite appeal, and sales appeal of your cheese by using Parakote. See your Marathon representative or write Marathon Corporation, Menasha, Wisconsin.

Parakote P-49

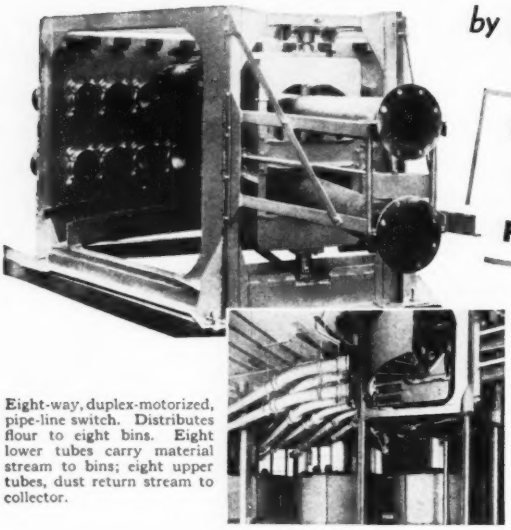
Marathon Corporation

packaging that sells food

BULK FLOUR AND SUGAR HANDLING

by The AIRVEYOR®

USING *NEW* MOTORIZED PIPE-LINE SWITCHES FOR STREAM DIVERSION



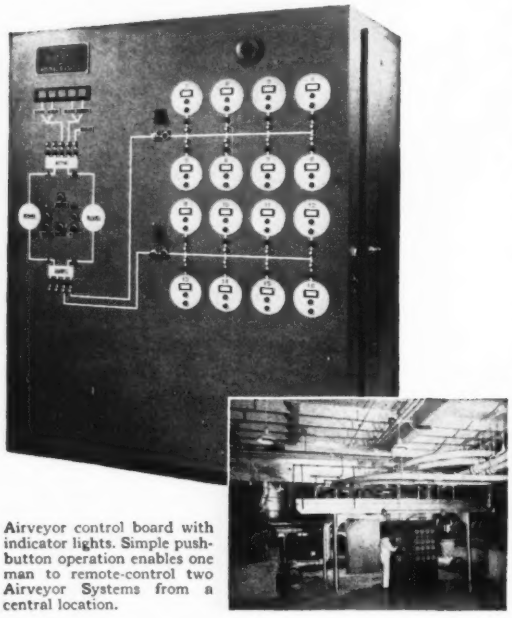
Eight-way, duplex-motorized, pipe-line switch. Distributes flour to eight bins. Eight lower tubes carry material stream to bins; eight upper tubes, dust return stream to collector.

When handling bulk flour and sugar in your plant, it can be done more completely, and above all, more efficiently by the Airveyor. The Airveyor readily adapts itself to the most unusual plant layout and building design, because the system is not subject to the straight-line limitations of mechanical conveyors. It conveys vertically, horizontally, and around corners at rates varying from a hundred pounds to several tons a minute . . . a complete and dependable system for unloading from bulk cars, trucks, portable containers, and bags, as well as in-plant distribution.

Where desirable, a master control board operates one or more motorized pipe-line switches, directing the flow of material from the desired intake point to the required distribution. Lights on the panel indicate routing of material, as well as full or empty bins. There is no limit as to the number of points to be served . . . motorized pipe-line switches can be had for vacuum or pressure systems, or a combination of both.

These switches are universal in application and move freely at all times; they're non-stalling, even when handling such materials as sugar or salt.

Investigate this convenient Airveyor method for handling flour and other dry, fine foodstuffs. A Fuller engineering study (proposal drawings and estimates) entails no obligation. It's part of Fuller's service—now in its 26th year—to help you solve your material-handling problems, efficiently and economically.



Airveyor control board with indicator lights. Simple push-button operation enables one man to remote-control two Airveyor Systems from a central location.

FULLER COMPANY, Catasauqua, Pa.
120 S. La Salle St., Chicago 3
420 Chancery Building, San Francisco 4

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

THE FRED D. PFENING COMPANY, COLUMBUS 8, OHIO
DISTRIBUTOR TO THE BAKING INDUSTRY IN THE UNITED STATES AND CANADA

A-141

Really "sealed-in" flavors that defy time are the result of the remarkable new SEALVA process. Each droplet of flavor oil is completely sealed from the atmosphere with an edible protective film. Yet SEALVA powdered flavors are readily soluble in water.

Until the development of SEALVA, there has never been a wholly successful method of overcoming volatility and oxidation of flavor from powdered foods, tablets, etc.

SEALVA flavors are the answer. They will retain strength, quality and freshness throughout the shelf-life required for packaged products.

SEALVA flavors can be supplied in the following flavors and the list is growing daily: *Strawberry, Raspberry, Cherry, Orange, Lemon, Lime, Peppermint.*

VAN AMERINGEN-HAEBLER, INC.

521 WEST 57th STREET, NEW YORK 19, NEW YORK

Alva FLAVORS

WHAT *Life-Lines* REALLY DELIVER IS MORE SERVICE...LESS SERVICING

What *Life-Lines* really deliver is

...more service
...less servicing

"We can't afford equipment breakdowns. We manufacture ice cream making machinery and operate franchise stores throughout the country. Store operators know very little about maintenance. We *must* select equipment that assures trouble-free performance with minimum maintenance. That's what Life-Lines give us. That's why we standardize on them."

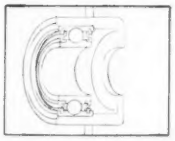
The above statement by the chief engineer of an eastern manufacturing plant tells the Life-Line story best. Summed up it means more service, less servicing with Life-Lines.

Take the Life-Linestarter®, for example. Contacts last longer because exclusive "De-ion®" arc extinction snuffs out arcs fast... reduces contact pitting. Simple seesaw balance of clapper prevents accidental opening; kickout spring prevents accidental closing. Compare with any other starter and see why Life-Linestarters offer *more service with less servicing.*

The Life-Line motor's advance design completely eliminates periodic lubrication. Pre-lubricated factory-sealed ball bearings need no greasing attention. Throw your grease guns away! Further, steel construction cuts breakage from rough usage. Superior insulation and winding techniques lengthen electrical life. On-the-job reports of a half million Life-Lines show why you get more service with less servicing.

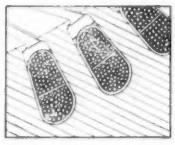
It costs no more to get Life-Line performance. Ask your Westinghouse representative for details or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-21684



MOTOR

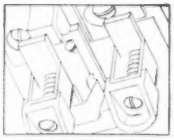
Needs no lubrication. Pre-lubricated factory-sealed bearings eliminate troubles due to under or overlubrication, dust and dirt.



Cuts winding burnouts. Pear-shaped slot design eliminates pockets. No corner voids remain to collect dirt, moisture.

STARTER

Never Jams. No sliding surfaces to wear—no sticking—no jamming—nothing to wear or replace.



Never needs filing. Silver-to-silver contacts eliminate filing. Discolored silver maintains high conductivity.

YOU CAN BE SURE...IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

BEAT HIGH HUMIDITY

. . . with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
- Provide wet strength
- Stop grease penetration
- Retain aromas, flavors
- Resist extreme cold
- Reduce breakage
- Prevent sifting
- Protect from light
- Resist alkalis
- Resist corrosion
- Boost machine efficiency

PROTECTION against high humidity is an important factor in the packaging of many products that are inclined to "cake." It is a problem Riegel has solved for hundreds of items, from dessert powders to headache powders. Usually many other properties must also be combined in the same paper. Whether the solution is a sheet of pouch paper, or a heat-sealed, triplex lamination of foil and glassine, Riegel can tailor-make the right paper . . . quickly, efficiently, economically. Just tell us what you want paper to do for you. Write to *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

Riegel FUNCTIONAL PAPERS FOR PROTECTIVE PACKAGING

- WRITE FOR SAMPLE BOOK

1901

This is one of National Tea Co.'s first stores in Chicago in 1901. Produce was brought in from the market every morning by horse and wagon. A selection of fruits and vegetables was set out in baskets for "sidewalk selling."

1924

The truck introduced a new era in grocery retailing. Swift city distribution made possible the early growth of the National Food Stores. As populations multiplied, the food demand necessitated city-wide store networks and speedy, systematic supply.

"Fruehaufs Are Indispensable To Our Growth"

"OUR FRUEHAUFS travel an average of 50,000 miles each per year on cross-country routes," states H. V. McNamara, President of the National Tea Co. "They are indispensable in our business and its growth. Today it's a necessity to transport food at great distances almost overnight, and the Trailer is by far the most economical means. We place Fruehauf Trailers first for quality of construction, dependability in operation, and durability."

Fruehauf builds the world's widest variety of Trailers. There is a Fruehauf dry freight or refrigerated van ideally suited for every kind of product. And Fruehauf's nation-wide chain of Branch Factories makes maintenance convenient, fast, and economical. Fruehaufs can help *your* business grow! Investigate now.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

DETROIT 32, MICHIGAN

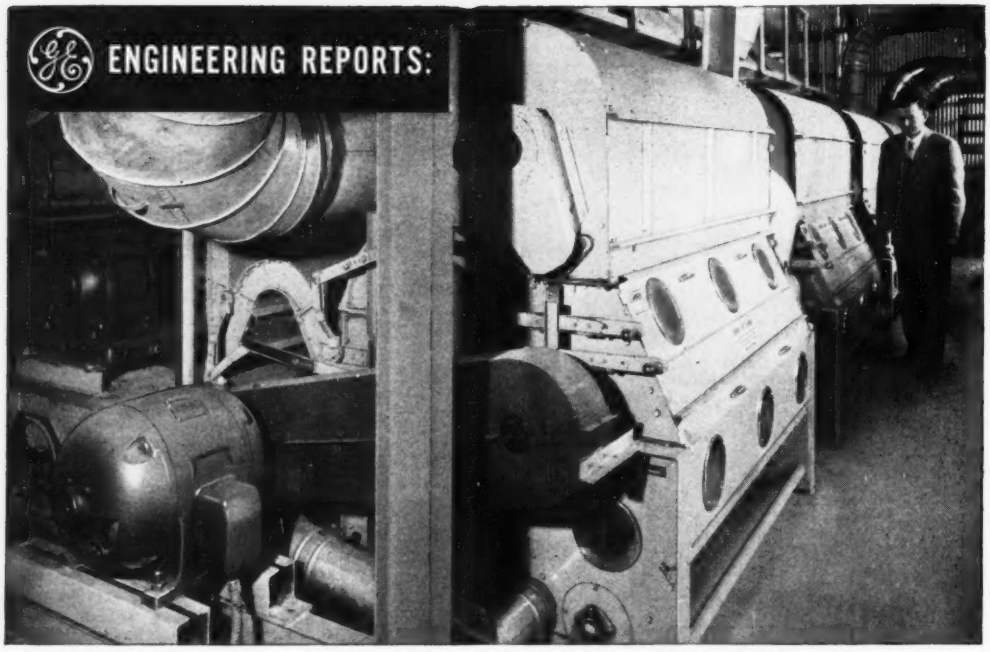
1952

The National Food Store of today—a complete super market—typifies another era in retailing —with transportation and the grocery business still progressing together. This big Stainless Steel Fruehauf is one of a great fleet of dry freight and refrigerator vans supplying more than 800 National Food Stores in 8 states. The company operates 90 Fruehaufs in the Chicago area alone.

FRUEHAUF Trailers

"ENGINEERED TRANSPORTATION"

ENGINEERING REPORTS:

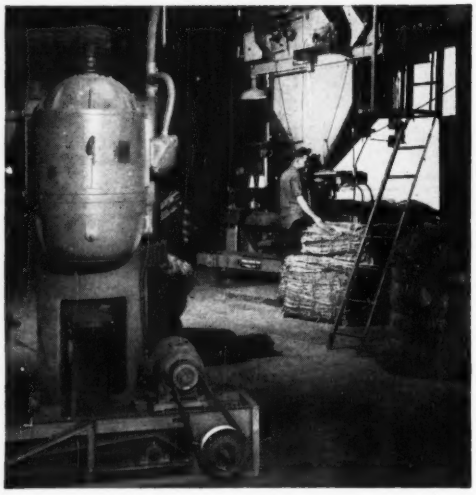


1 **DRIVING THE LINT CLEANER** on this Murray Gin is a standard 15-hp G-E Tri-Clad* motor. Enclosures for motors throughout the plant were carefully selected to meet specific atmosphere prevailing in each area. The gin is one of five, each of which can produce about 450 tons of seed per day when in full production.

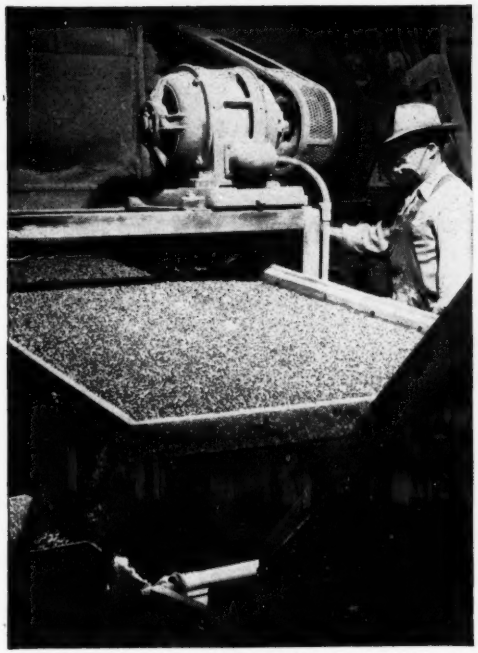
*Registered trade-mark of General Electric Co.

Continuous processing keeps output

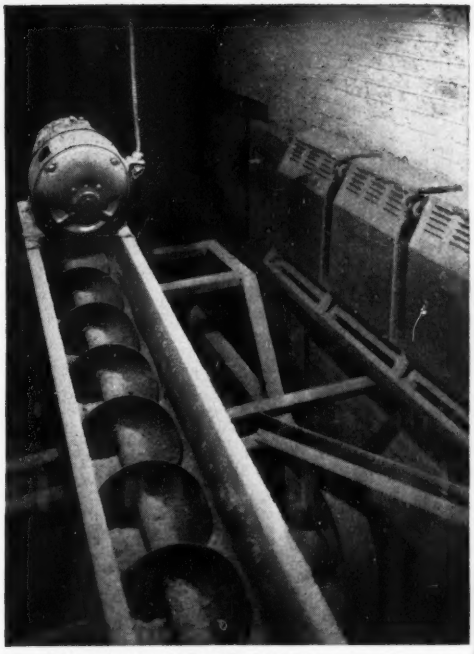
4 **"FOR 24 HOURS A DAY,** these G-E 40-hp vertical motors take heavy loads and never give a bit of trouble," says Tom Degnan, in charge of separator room.



5 **PELLET MACHINE,** driven by 50-hp G-E totally enclosed fan-cooled motor, produces cattle-feed pellets from ground seed. Pellets are sacked by machine at right.

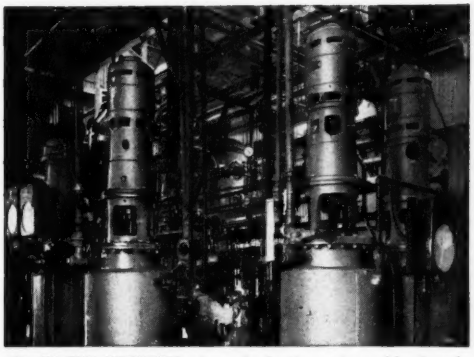


2 **SEPARATOR FREES CRACKED SEED** from hulls. The 15-hp G-E motor shown is standard screenless open textile motor which prevents clogging from lint by means of free flow of air through motor.



3 **AUGER MOVES CLEANED SEED** from separator room. Auger is driven by a 5-hp G-E gear-motor. Three G-E 15-kva, 60-cycle transformers are for lighting circuits in this plant area.

high at Producers' Cotton Oil Co.



6 **IN THE REFINERY,** six re-hydration mixers blend soda ash with cottonseed oil to remove impurities and soap stock. Mixers are driven by 15-hp vertical G-E motors.

76 tons of oil, 191 tons of meal produced per day with help of G-E drive systems

To turn out an average seasonal yield of 21,760 tons of oil and 54,400 tons of meal, Producers' Cotton Oil Company, Fresno, Cal., keep their processing line working 24 hours a day, every day of the season.

One important reason why the plant can produce at such a pace, without let-up, is this: careful planning went into the electrical system. General Electric application engineers—specialists in electrification of food processing—worked with plant engineers and machinery manufacturers to select standard apparatus to fit the specific production and atmospheric requirements of this plant.

If *you* plan to install a new processing line, or modernize an old one, G-E application engineers can help you. Your nearest G-E Apparatus Sales Office will tell you more. General Electric Company, Schenectady 5, N. Y. 652-12

Engineered Electrical Systems for Food Plants

GENERAL ELECTRIC

make stainless go a long way

With a little planning *you* can help stretch out the nation's stainless supply — and get faster delivery of stainless for *yourself!*

Crucible will be glad to help you accomplish this. Our metallurgists and stainless fabricating specialists have a wealth of experience with stainless. They can help you select satisfactory grades and finishes more readily available than those you are now using. This will help ease the bottleneck on stainless and will enable you to get faster delivery.

Call us today. We shall be glad to help you out.

CRUCIBLE first name in special purpose steels

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REZISTAL STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

this Pump pays its own way

...and MORE!

Here's the secret. This impeller has no blades to catch or damage food products.

You'll find a Fairbanks-Morse *Bladeless* Impeller Food Pump will more than pay for itself . . . in a short time. It eliminates the food damage losses so common with ordinary transfer pumps . . . assures important savings in handling costs.

Fairbanks-Morse *Bladeless* Impeller Pumps have handled the most delicate fruits and vegetables *without damage*. Even hard-boiled eggs have been pumped without cracking.

You'll find it will pay you to investigate the Fairbanks-Morse *Bladeless* Impeller Food Pump for your operations. For complete information, call your Fairbanks-Morse Branch Pump engineer or write to Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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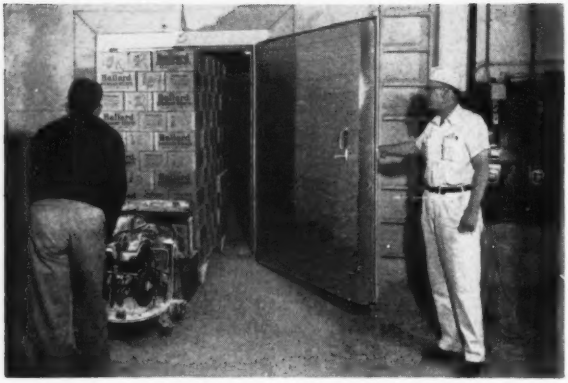
a name worth remembering

PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • SCALES
HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY • MAGNETOS



Loading packaged biscuits into storage room at Ballard and Ballard where two Carrier Cold Diffusers keep temperatures between 35 and 40 degrees.

They're making better dough with Carrier Refrigeration

Down in Atlanta, Georgia, Ballard and Ballard are making biscuits that take mighty fine southern cooking into homes all over the country.

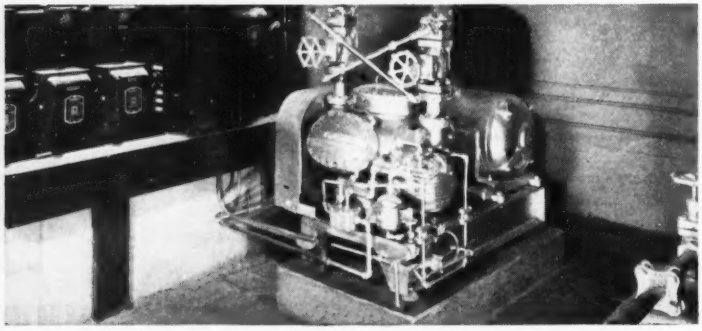
It's important that they get there fresh. So they're stored in a near-freezing room until shipment. Here's where refrigeration plays a big part in the success of the business.

It must be dependable, must keep temperatures in the safe range. In the many years the Carrier Compressor and Cold Diffusers have been on the job cooling biscuits, there has never been a breakdown . . . temperatures have always been constant.

Carrier Refrigeration can give the same dependable service to you, whatever your food cooling requirements might be. Give your Carrier dealer a call. He's a factory-trained specialist, backed by Carrier's fifty years' experience. The equipment he handles is the most modern, efficient and dependable in the business. Carrier Corporation, Syracuse, New York.

Carrier

AIR CONDITIONING
REFRIGERATION
INDUSTRIAL HEATING



On the job for years, this Carrier Compressor is ready to give a lot more satisfactory service at Ballard and Ballard. Its unique design, with exclusive Carrier features like short piston stroke and positive lubrication system, put it ahead of other compressors on the market.

THE NEW VANILLA-LIKE *Flavor* MATERIAL

VANITROPE®

improves flavor

As a vanilla-like flavoring agent of extremely high potency, VANITROPE has demonstrated an unusual adaptability in all branches of the food, confectionery, baking and ice-cream fields.

Its advantages are these....

FLAVOR

Used in substantial proportion with other synthetics, VANITROPE brings flavor closer to the true natural vanilla.

STRENGTH

The flavor strength of VANITROPE is sixteen times that of vanillin. In the presence of sugar, this ratio is considerably higher.

CHARACTER

Pure white crystalline synthetic, non-discoloring and non-hygroscopic, with a remarkable stability at high processing temperatures.

COST

The use of VANITROPE permits savings of up to 50% over standard vanilla-like synthetics at equivalent flavor strength.

VANITROPE has proven its value in nationally distributed foods as well as in exhaustive laboratory investigations. VANITROPE, a registered trade name for propenyl guaethol, is of interest to all flavor users. . . . . Inquiries are solicited. Samples and technical bulletins are available for study.

VANITROPE IS A CONTRIBUTION OF

Shulton Inc.
FINE CHEMICALS DIVISION
630 FIFTH AVENUE, NEW YORK 20, NEW YORK

 For more information, use post card on last page.

GAS BAKING

at GENERAL BAKING COMPANY, Detroit, Michigan

is flexible,

uniform,

fast and clean

This 100-foot tunnel Gas-fired oven, installed recently at General Baking Company, is direct-fired, with the products of combustion recirculated through the baking chamber, for maximum efficiency. Two additional gas-fired, Thermoflow Ovens are being installed by General Baking Company, on the basis of baking efficiency evidenced by this oven.

FLEXIBILITY of this Modern Gas Baking Equipment permits accurate retention of any desired temperature in each heat zone. Precisely controllable temperatures can be rapidly changed as the oven charge varies.

UNIFORMITY of baked goods is acclaimed by users. One baker reports: "Our bread has a beautiful bloom . . . evenly colored . . . and no variation in loaf color from one side of oven to the other."

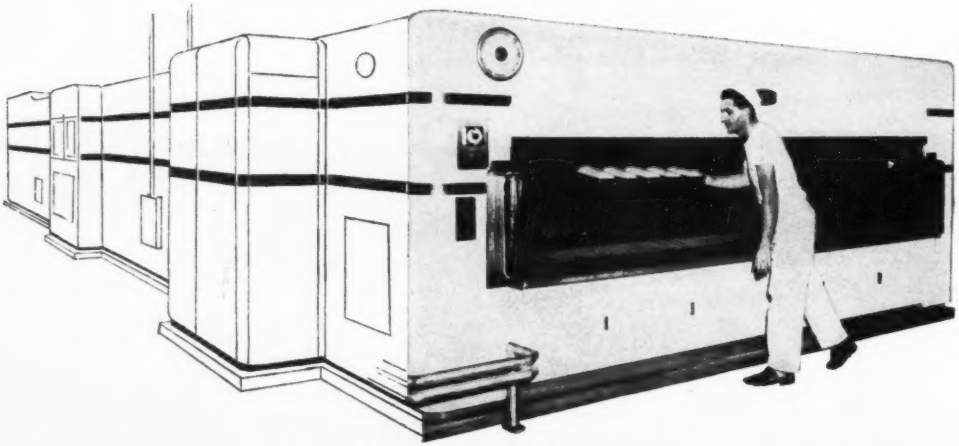
SPEED in baking is essential for high production. Initial tests at General Baking Company showed that a 1¼ lb. loaf of bread which required 24 to 25 minutes to bake, is now processed in 20 minutes or less.

CLEANLINESS is also of prime importance. Modern Gas Baking Equipment provides cleanliness of product. The General Baking Company's oven utilizes the products of combustion for baking, with clean efficiency.

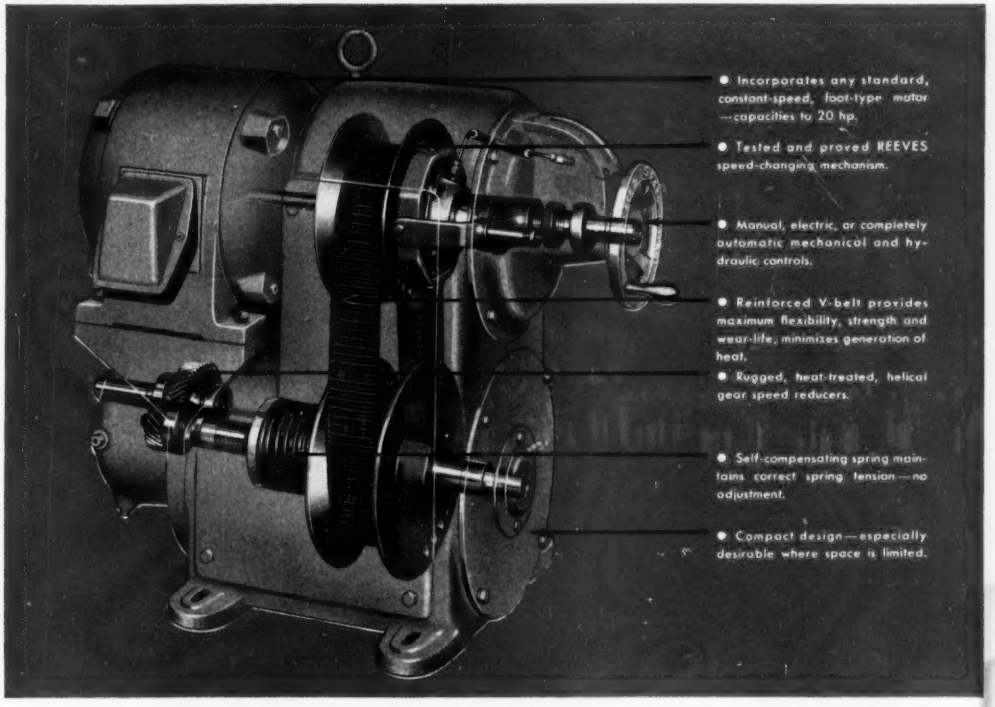
Whether your bakery is large or small, Gas and Modern Gas Baking Equipment serve you best, because Gas is the Baking Fuel that is Clean, Fast, Uniform, Flexible, and Dependable. Get the Facts today from your Gas Company Representative.

MORE AND MORE . . .
THE TREND IS TO GAS
FOR COMMERCIAL BAKING

AMERICAN GAS ASSOCIATION
420 Lexington Avenue • New York 17, N.Y.



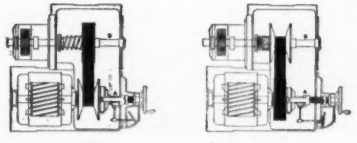
The Readco Thermoflow Grill Hearth Tunnel Gas-fired Oven installed at General Baking Company provides baking flexibility, uniformity, speed, and cleanliness.


● Incorporates any standard, constant-speed, foot-type motor —capacities to 20 hp.
● Tested and proved REEVES speed-changing mechanism.
● Manual, electric, or completely automatic mechanical and hydraulic controls.
● Reinforced V-belt provides maximum flexibility, strength and wear-life, minimizes generation of heat.
● Rugged, heat-treated, helical gear speed reducers.
● Self-compensating spring maintains correct spring tension—no adjustment.
● Compact design—especially desirable where space is limited.

Everything's built in—

and built to give your machines trouble-free, stepless speed adjustability in the

REEVES Vari-Speed Motodrive®



Minimum Speed Position — Maximum Speed Position

REEVES Vari-Speed Motodrive utilizes proved REEVES operating principle of a V-belt driving between two pairs of cone-shaped discs which are adjustable to form an infinite number of driving and driven diameters. Discs are mounted on parallel shafts. One shaft receives power at constant speed from motor —other delivers power at infinitely adjustable speed to gear reducer from which desired speed is transmitted to driven machine.

Here's a complete variable speed power plant in one, space-saving unit . . . incorporating an operating principle proved in 300,000 installations . . . ruggedly constructed for years of trouble-free service. Without stopping the machine, a turn of the REEVES handwheel or touch of a button provides the correct speed for every operation . . . enables the machine to do *more* work and *better* work at lower cost. Available in vertical and horizontal designs; capacities to 20 hp; and speed ratios as great as 10 to 1. For the machines you are now operating and the new ones you plan to buy, obtain all the benefits of stepless speed adjustability by specifying modern REEVES Vari-Speed Motodrive. Send for free catalog No. FE67a-G.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of variable speed control

accurate · variable
REEVES *Speed Control*

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It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

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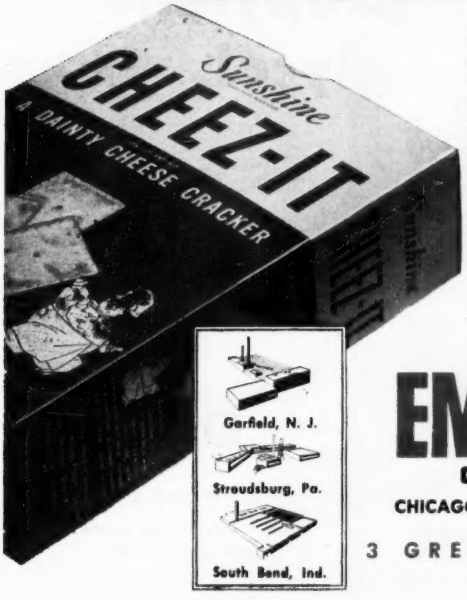
let EMPIRE BOX show you

HOW TO KEEP COSTS DOWN!



Smooth those ruffled feathers. Get an earful of Empire's realistic packaging that gives you top quality at the price you want to pay.

Empire's nearly half-century of experience enables it to save you money—without sacrificing quality. Reason: Empire controls quality from start to finish . . . produces its own paperboard . . . even blends its own ink . . . precision engineers every package . . . and provides a complete, top-talent art department. In addition, you get added savings from Empire's multi-plant operation that lowers your costs . . . helps assure on-time delivery!

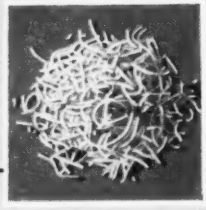
Call or write the Empire office nearest you today — put our specialists to work for you. The result will be a feather in your cap.

EMPIRE BOX
CORPORATION

CHICAGO, ILL. GARFIELD, N. J.

3 GREAT PLANTS TO SERVE YOU

for a really good moistening agent



use

propylene glycol, U.S.P.

Dow propylene glycol, U.S.P., is a valuable aid in controlling the moisture level in many solid food materials. Dried fruits, coconut, nutmeats and many other foods benefit from the use of this hygroscopic material which attracts and holds moisture from the air.

Propylene glycol as a solvent, humectant, emulsifying aid or wetting agent can help you realize economies in your food plant. Find out how by writing to Dow, Dept. OC 17.

THE DOW CHEMICAL COMPANY
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DOW

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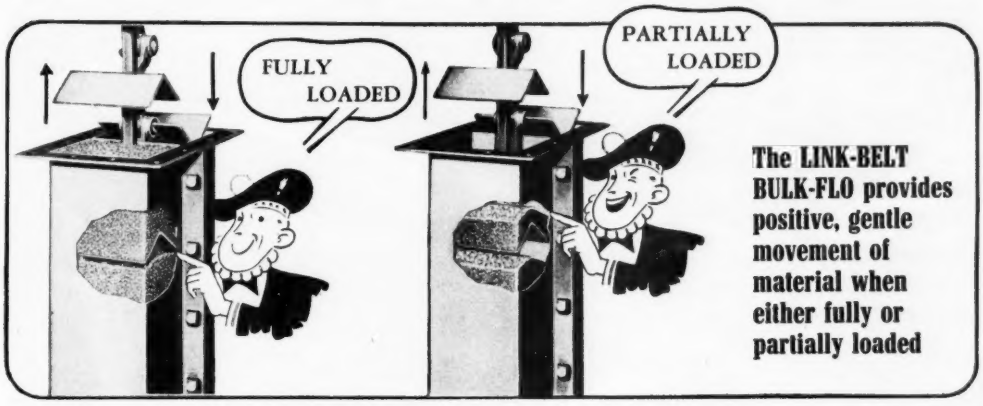
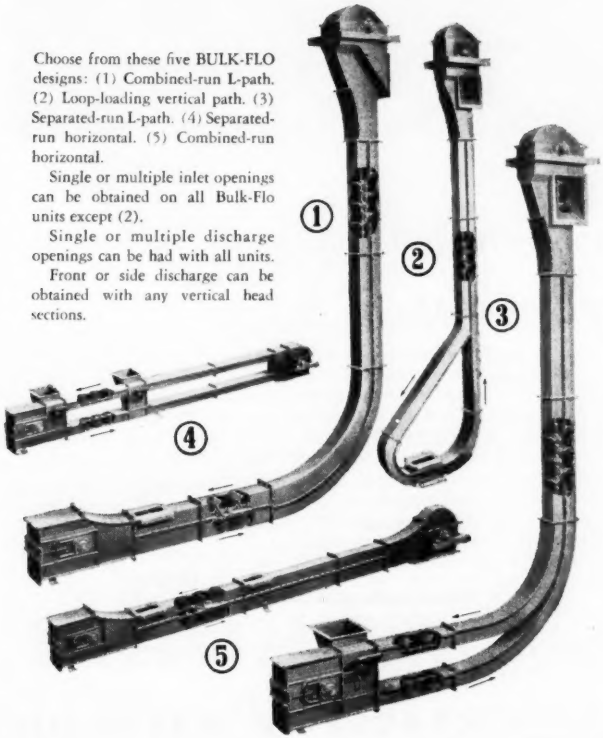
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

Combined feeder · conveyor · elevator cuts your handling costs



The LINK-BELT BULK-FLO provides positive, gentle movement of material when either fully or partially loaded



Choose from these five BULK-FLO designs: (1) Combined-run L-path. (2) Loop-loading vertical path. (3) Separated-run L-path. (4) Separated-run horizontal. (5) Combined-run horizontal.

Single or multiple inlet openings can be obtained on all Bulk-Flo units except (2).

Single or multiple discharge openings can be had with all units.

Front or side discharge can be obtained with any vertical head sections.

BULK-FLO gives you true versatility in bulk materials handling . . . at lower cost. It replaces several units in less space . . . cuts initial outlay. And because solid flights operate independently of internal pressure, BULK-FLO can be operated at less than full capacity, with positive movement of materials.

That means capacity can be varied by regulating the feed. It also means gentler handling —material is protected in individual "compartments" to minimize degradation.

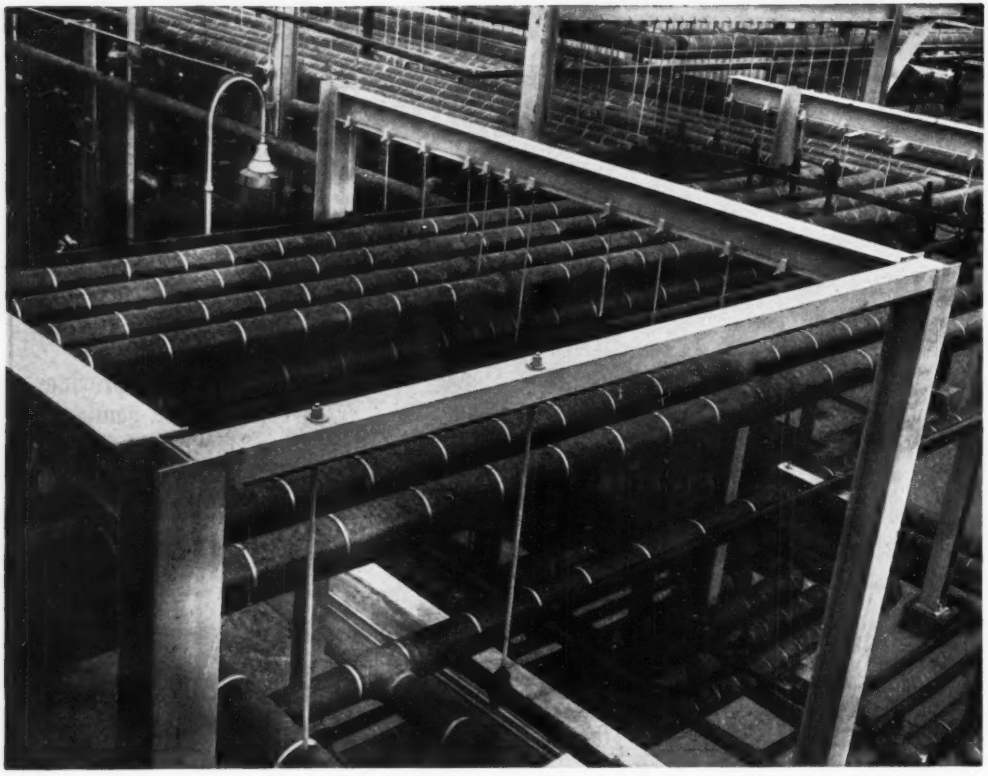
And note this—regardless of the amount of material being fed, BULK-FLO is self-clearing through intermediate runs. This feature allows you to alternate batches of different materials and prevents contamination.

You can get complete information on BULK-FLO from the Link-Belt office near you. Or write for your copy of Book 2175.

LINK-BELT

BULK-FLO
FEEDERS · CONVEYORS · ELEVATORS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12,602-H



Outdoors, too, you can count on

"FEATHERWEIGHT" 85% Magnesia

You don't have to pamper "Featherweight" 85% Magnesia! This versatile, dependable insulation does the same efficient job outdoors as well as indoors, on any heating application up to 600°F.

The photograph above shows a part of one of the largest outdoor installations of its kind. The thousands of feet of pipe in this project carry various liquids and gases at many different temperatures. Some of the lines are traced with steam in ½" iron pipe; other lines are steam jacketed. In every case it is important that critical temperatures be held as closely as possible.

"Featherweight" 85% Magnesia, with a weatherproof covering, is an efficient insulation for this application. It will undoubtedly last the life of the plant—and *never* lose its efficiency!

Such service is to be expected of this remarkable material. "Featherweight" 85% Magnesia is structurally strong. It withstands reasonable compression, vibration, and contact. It is physically inert, and its insulating qualities are unaffected by alternate heating and cooling. It is entirely mineral, thus, will not burn. When used along with K&M Hy-Temp Insulation, its usefulness is extended to applications up to 1900°F.

Your Keasbey & Mattison Distributor is an experienced applicator able to answer your questions about "Featherweight" 85% Magnesia. See him, or write us direct for more information.

Nature made Asbestos . . .

Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON

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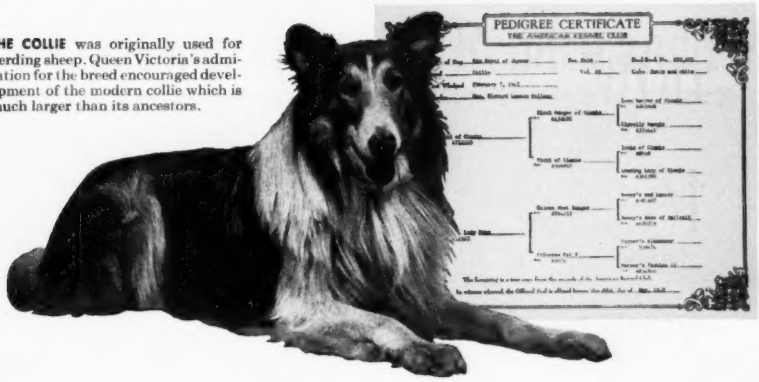

THE COLLIE was originally used for herding sheep. Queen Victoria's admiration for the breed encouraged development of the modern collie which is much larger than its ancestors.

Take No Chances—

Buy Boxes By Their Pedigree

EXPERIENCED BUYERS know there is *extra* assurance in buying boxes with a pedigree.

That's why P. Ballantine & Sons rely on Union boxes to carry great quantities of their famous beer and ale from brewery to dealers' shelves.

Many other makers of national brand merchandise know the Union shield on a box means it is made by the leader in Kraft packaging, operating five of the world's largest paper machines in a completely integrated pulp-to-container plant. Linked with this great plant are tremendous forest resources and four modern box plants—and one management with one high standard of quality control supervises everything from timber to finished box.

That is why makers of many national brand products know that Union corrugated boxes give *extra* assurance of consistent quality, consistent service and fair price.

TRADE MARK
UNION

Dependable Packaging Since 1872

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

how to keep

out of a

If your jelly has been getting into a jam because of short shelf life, it's time to start using Monsanto Sodium Benzoate as your preservative. You can depend on sodium benzoate to preserve jelly, jam, preserves, margarine and scores of other foods. As little as one-tenth of one per cent is all that is needed.

Monsanto Sodium Benzoate is one of the purest chemicals produced in commercial quantities. Like other Monsanto Chemicals for foods, sodium benzoate is produced under strict laboratory control.

You can get Monsanto Sodium Benzoate in flake or powder form. They are equal in quality but many users prefer flakes because they do not ball or cake and are practically free from dust.

For your free copy of the 16-page Monsanto booklet, "*Benzoic Acid and the Benzoates*," contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Mo.

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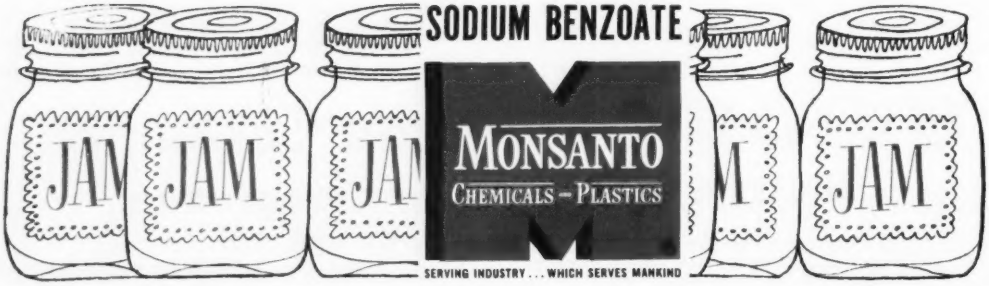

SODIUM BENZOATE

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SERVING INDUSTRY . . . WHICH SERVES MANKIND

Tough Customer turns out Refined and Polished!

VISKON IS STRONG WHEN WET!

A great advantage over paper filters—offers high wet strength, longer filter life, greater dependability.

VISKON IS DURABLE!

Insoluble in common organic solvents—ideal for use under high pressure and heat conditions.

VISKON HAS HIGH FLOW RATE!

Gives maximum flow rate with required clarity. Filtering cycle is lengthened.

VISKON IS ECONOMICAL!

Down time is reduced—clean-up time costs less than woven fabrics.

VISKON nonwoven fabrics

. . . another product to fit today's needs by

THE VISKING CORPORATION
NORTH LITTLE ROCK, ARKANSAS

New VISKON simplifies, improves hot lard refining for major packing house*

Filtering and polishing hot lard under high pressure was a tough problem for a leading midwestern meat packer. Then they switched to **VISKON** nonwoven rayon fabric backed with regular canvas ducking. **VISKON** performed the final polishing job with high efficiency—throughout the entire filtering cycle. Down time for cleaning and dressing was greatly reduced.

VISKON is insoluble in common organic solvents, has exceptionally high flow rate, porosity and resistance to deterioration. And, with all these important advantages, **VISKON** *is economical!*

VISKON is made from textile fibers bonded with cellulose, either cotton or rayon or a combination of both. Whatever your individual needs, **VISKON** can do a better job for you.

Investigate today . . . write for complete information.

**Name in Our Files*

Please send us additional information and samples of VISKON nonwoven fabrics.

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Name.....
Position.....
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City.....*Zone*....*State*.....
Name of equipment used.....

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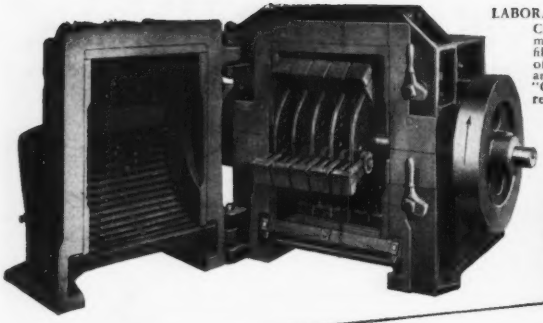
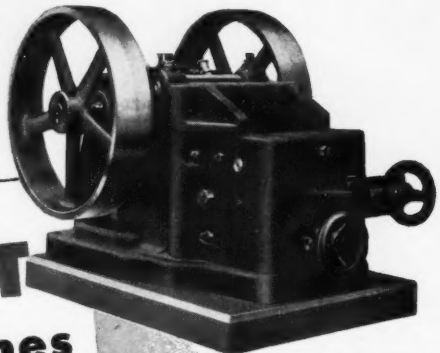


LABORATORY SWING-SLEDGE MILLS

Capable of reducing soft, moderately hard and tough or fibrous materials to any degree of fineness between 1 in. and 20 mesh. The patented "Open-Door" feature permits ready accessibility for cleaning.



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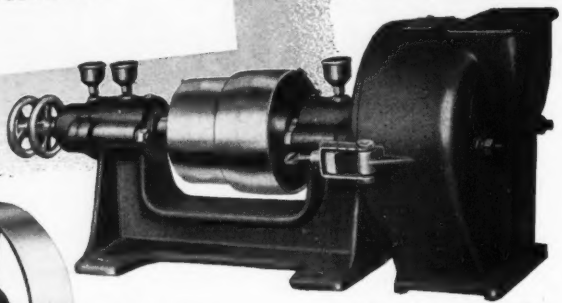
Laboratory Machines

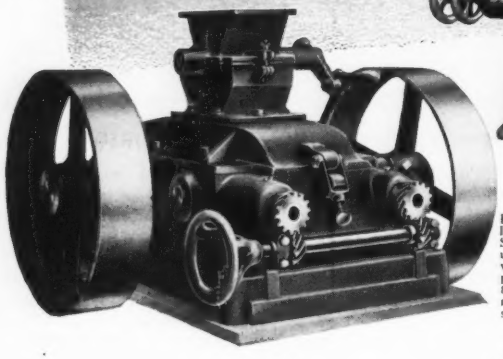
Assure Quality of Products

Fast - Economical - Accurate

LABORATORY JAW CRUSHERS

Special Roll Jaw action simplifies close regulation of the product with capacities varying from 300 or 400 lbs. per hour at finest settings, to 1000 or 2000 lbs. when opened for coarser work. Each part of the crusher is accessible for quick and easy cleaning.





LABORATORY CRUSHING ROLLS

First designed especially for laboratory sampling work, Sturtevant Crushing Rolls are used regularly in many plants where there are limited outputs. Range of output for the 8 x 5 size is from ½ in. to 20 mesh — and for the 12 x 12 size from ¾ in. to 20 mesh.

LABORATORY SAMPLE GRINDER

Laboratory Sample Grinders are of the "Open-Door" disc type and are capable of very fine work, producing products as fine as 100 mesh (coarser if desired) when working on dry, friable, soft or moderately hard materials. Simply turn hand wheel to provide product regulation from 10 to 100 mesh.

The only sure way to maintain strict quality of products is laboratory control . . . and that calls for accurate sampling.

Sturtevant Laboratory Equipment meets the exacting requirements of laboratory work. They are fast and accurate . . . provide true samples.

Rugged and dependable, Sturtevant equipment actually has all the features of full size machines plus extra accuracy and wider range of adjustment. The "Open-Door" accessibility permits quick, thorough cleaning . . . prevents the possibility of previous batches from contaminating new samples.

Investigate Sturtevant equipment for your laboratory. It will cut your sampling costs . . . help maintain strict quality of products . . . increase sales. Write for complete details and catalog.

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...to Balance Load Factor with Low Investment
...to Meet Present Needs and Future Expansion...

CLEAVER-BROOKS self-contained steam boilers are the answer to both present and future steam needs. You can install Cleaver-Brooks boilers in units to fit your present steam capacity requirements . . . keeping your investment at a minimum and your boiler efficiency at a maximum. Here's how it works . . .

Your initial Cleaver-Brooks boiler installation is made in the size or capacity to fit your present steam load — this assures full use now at top efficiency and low capital investment.

As increased steam needs arise, additional Cleaver-Brooks boilers can be added to keep pace with your expanded requirements.

With this flexible program, you have the greatest return from your boiler investment — minimum original cost and lowest operating cost. Your boilers are always operating at maximum efficiency (80%) over the entire working range (30 to 100%).

Cleaver-Brooks self-contained boilers are ideal for multiple installations because of their compactness, low headroom requirements, fast installation, automatic operation, range of sizes. Available in standard models—15 to 500 hp.; 15 to 250 psi; gas, oil or combination gas and oil fired units.

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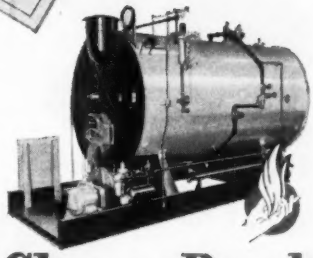

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You can profit from this trend by fortifying your foods with Pfizer Vitamin A products. Derived from Crystalline Vitamin A Acetate, they are extremely pure and free from fishy taste and odor.

Pfizer Vitamin A Palmitate, for food processors requiring a form easily dispersible in water or soluble in oil, is of high purity and superior stability. This light colored liquid is practically odorless and tasteless. Available at a potency of not less than 1,700,000 U.S.P. units per gram and in corn oil solutions at a standardized potency of 1,000,000 U.S.P. units per gram.

Crystalets*, the dry, free-flowing, stabilized form of Pfizer Vitamin A. Pure Vitamin A Acetate is enveloped in a coating of food-grade gelatin and sugar. Protected by this coating, the Vitamin A survives long periods of shelf life without losing its potency. This means *excessive overages will not be required* to maintain potency levels. Crystalets are easy to store, handle and incorporate in your products . . . no special precautions are necessary. They are available at a standardized potency of 250,000 and 500,000 U.S.P. units per gram.

Pfizer Crystalets and Vitamin A Palmitate are recommended for a wide variety of food and beverage products: baby foods, milk, chocolate, candy, infant formula ingredients, peanut butter and pudding powders.

We will be happy to send you Technical Bulletin #36, Vitamin A Products for Foods and Beverages, or discuss the possibilities of fortifying your food products with you. Call or write:

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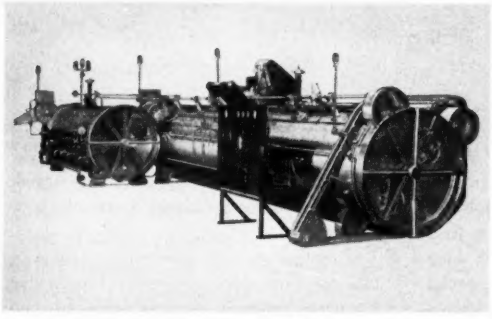

FMC STERILMATIC lines are constructed in several Cooker and Cooler shell combinations to meet the demands of a variety of products requiring extremely long or short cooks.

Through this centralized instrument board, "nerve-center" of the FMC STERILMATIC Pressure Cooker and Cooler, the operator has complete and accurate finger-tip control through every stage of sterilizing and cooling.

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Write for new booklet describing modern FMC Continuous Cookers and Coolers —now available on request.

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For almost 40 years, Glycerine has contributed to the keeping qualities of Heide "Licorice Pastilles". Glycerine's ability to retain moisture improves the shelf life of these familiar candies... keeps them fresh longer!

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Improved stability of Glycerine supply means you can count on dependable delivery of this time-tested ingredient. You can confidently build your formulations around Glycerine—without concern for emergency substitutions.

Candy manufacturers and many other food processors rely on Glycerine's humectant action to preserve freshness and maintain palatability. It is widely used as a solvent for flavoring and coloring agents. Glycerine also acts as a sweetener and blending agent. Its high viscosity imparts smoothness to mixtures, prevents graining.

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In hundreds of applications in the food field, U.S.P. Glycerine provides an unmatched balance of properties, ready acceptance, and established freedom from toxicity. Write for a copy of the booklet, "Why Glycerine for Foods?"

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RIGHT IN YOUR OWN BACK YARD... BY WEST
THE DISPENSARY GETS ONLY GOLDBRICKS SINCE THE WEST CONTROL PROGRAM KO'D DERMATITIS
I THREW OUT THE S.R.O. SIGN WHEN WE STARTED WITH THE WEST DERMATITIS PLAN.. AND OUR MEDICATION AND TREATMENT COSTS TOOK A NOSEDIVE!
HEY, DOC! THE SHOWERSAN HAS TURNED THE BOYS INTO ATHLETES... WITHOUT ATHLETE'S FEET!
WOW! THAT WEST ANTISEPTIC PROTECTIVE CREAM REALLY DOES THINGS FOR ME!
SEE YOU'VE GOT THAT EXECUTIVE TILT, DOC, SINCE WE'VE CLEANED UP OUR DERMATITIS!
MM...MM! I COULD HOLD YOUR SOFT HANDS FOREVER!
THIS DURMA-GARD OUTFIT IS BETTER THAN MUDGUARDS... NO SPLASH, NO SPLATTER, NO SPILL!
RIGHT, BOSS! SINCE WE PUT IN THE WEST 4-STEP PROGRAM, NOBODY COMES IN HERE EXCEPT TO DATE THE NURSE!
MY HANDS USED TO FEEL LIKE THE SAHARA DESERT 'TIL I STARTED USING WEST SULPHO HAND CLEANER
MEDICAL DEPT HOURS

What Are Your Hidden DERMATITIS Costs?

Compensation and medical care are only the beginning with a case of dermatitis. Add the cost of absenteeism, replacement training, sacrificed quality, lowered morale, and lost production and you get the true picture — a staggering expense of $100,000,000 a year to industry. All needless, *because dermatitis can be controlled!*

How? With West's simple, inexpensive prevention and control plan that... (1) makes sure of personal cleanliness (2) protects exposed skin areas (3) prevents clothing contamination (4) guards against special hazards.

The WEST Dermatitis Control Program is based on an in-*your*-plant survey—made without obligation or inconvenience to you. Simply mail the attached coupon.

WEST DISINFECTING Company

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FREE

YES! We're interested in DERMATITIS Control. Dept. 88

☐ Please have a WEST representative call

☐ Please send FREE Dermatitis Control Booklet

Name..... Title.....

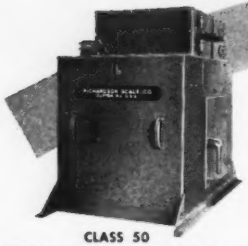
Company.....

Address.....

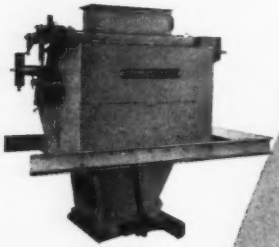
City..... Zone..... State.....

For more information, use post card on last page.

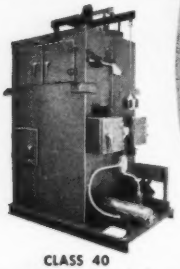
what can WE do for YOU Mr. Processor?



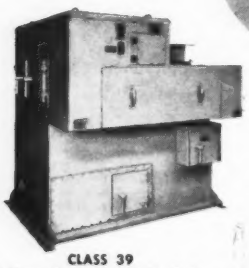
CLASS 50
Dust-tight, all-electric, high-speed, accuracy-indicating scale for weighing dry, ground, granular, dusty, non-free-flowing and some small lumpy materials. Bulletin 3649.



CLASS 38
Dust-tight, heavy-duty scale for dry, ground, dusty, non-free-flowing materials. Bulletin 8946.



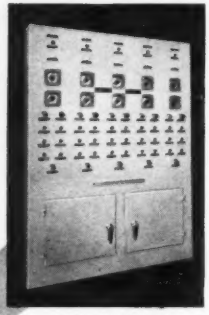
CLASS 40
Accommodates screw, belt, or vibrating feeder for handling wide range of materials. Dust-tight, solenoid- or motor-operated discharge, accuracy-indicating. Bulletin 1449.



CLASS 39
Self-contained, dust-tight, belt-feeding and weighing unit. Accuracy-indicating for process or intermittent batch weighing of lumpy, crushed, sluggish materials. Bulletin 1549.

Frankly, that's the reason we're running this ad—not to tell you about our products, but to ask you about your plant problems. Because if your business involves the handling of any materials or liquids by weight, we think you probably have an operation or two which just doesn't measure up in efficiency, economy, or speed. We'd like to know about it, because we think we can help.

You can call it pride, or conceit, or self-satisfaction, or self-confidence, but our engineers have never been stumped for long by a problem in materials-handling by weight—and in fifty years of working with the biggest names in American industry we've seen a lot of them! From aluminum sulphate, to zinc oxide, and back to almonds we've successfully installed Richardson units or systems to handle just about everything in the book, and built a lot of goodwill and a fair-size company in the process.



CONTROL PANEL
Richardson-designed panels such as this control whole automatic weighing systems composed of scales like those at the left.

Naturally, if a Richardson Scale can contribute to the smoother, faster, or more profitable operation of your plant, we'd like to sell you one. We think that our products and experience can help in solving your problem in processing, and if you'll outline it, we'll be glad to have one of our field engineers arrange to go over it with you.

Or, if you'd just like to know more about Richardson Scales for possible future reference, simply clip this ad to your signed letterhead and mail. Bulletins 0450, 0550, and 0351 will be sent you by return mail—no obligation.

The Richardson Scale Company, Clifton, N. J., will be glad to supply information on:

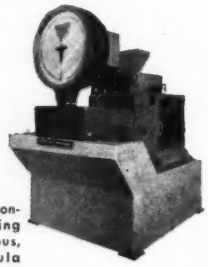
Feeder-Weigher Systems • Automatic Bulk Weighing Hopper Scales • Automatic Bagging Scales • Bag Sewing Conveyors Packers • Process Control Panels and Select-O-Weigh

Please write direct to our Clifton office, or to the nearest of our branch offices located in Atlanta, Boston, Detroit, Minneapolis, Cincinnati, Wichita, Montreal, Omaha, New York, Pittsburgh, San Francisco, Toronto, Buffalo, Chicago, Philadelphia, Houston, St. Louis.

Richardson

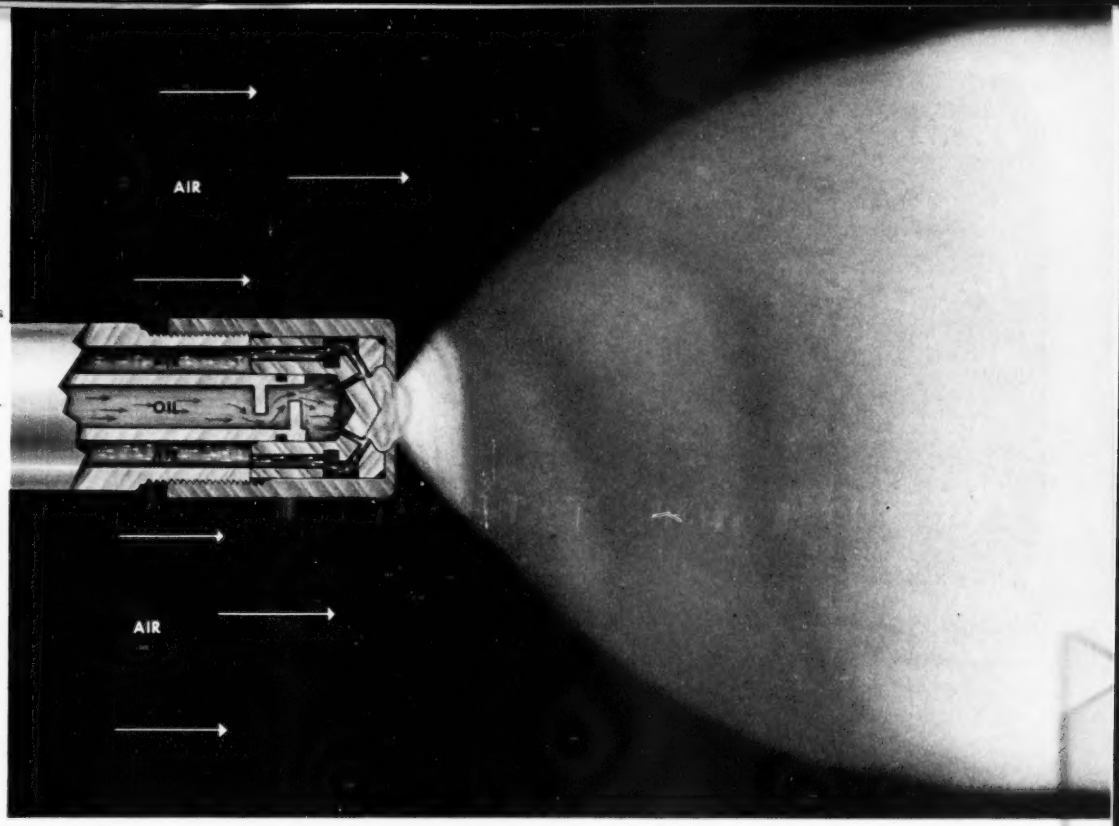
MATERIALS HANDLING BY WEIGHT SINCE 1902

CLASS 56
Self-checking, automatic feeder-weigher for large tonnage; practically continuous stream delivery. Beam system has approval of all weighing authorities. Bulletin 2140-2.



SELECT-O-WEIGH
On electronic weight control system providing remote, instantaneous, dial-control formula changing and ingredient selection for all proportioning applications. Bulletin 0351.

8369



NOW—only Powermaster gives you VORIFLOW combustion!

LATEST DEVELOPMENT IN BURNER DESIGN REDUCES COSTS AND INCREASES BOILER EFFICIENCY

Here's what *Powermaster's* new VORIFLOW burner will do for you:

1. Saves fuel by providing infinitely variable combustion modulation in response to demand—with *full efficiency*—through wide range from 30% to 100% of firing capacity.

This means elimination of waste and maintenance headaches because of incomplete combustion. With the exclusive design of the VORIFLOW burner, tiny jets of compressed air pulverize every droplet of oil . . . projecting a fine fog of oil/air emulsion into the combustion area where it ignites and burns —immediately and completely. The VORIFLOW burner does away with outmoded mechanical spinning devices, globules of wasted oil, and gummy cleaning problems.

2. Slashes boiler maintenance costs.

There are *no* moving parts to wear out • There is *no* cup to clean daily. Routine cleaning of the burner once a month is sufficient • There is *no* burner vibration to throw adjustments "out of whack" • Parts are made of stainless steel, brass, and beryllium copper—they will last indefinitely.

3. The combination burner permits rapid change-over from one fuel to another—light oil, heavy oil, or gas.

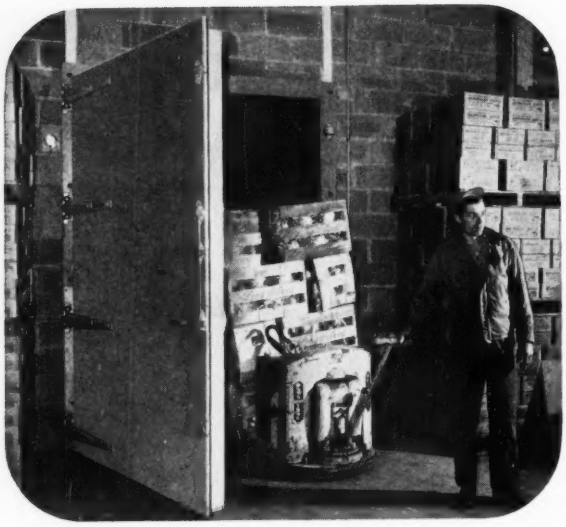
And when we say "rapid" we mean just that—the job can be done in four minutes. Modulating firing controls are ready to go into action at the flick of a switch. It isn't necessary to change the entire burner assembly. All you need to do to fire gas is to remove the oil nozzle.

Before deciding on a boiler for your plant, be sure to get the facts on the newest POWERMASTER with VORIFLOW combustion. Write for this catalog that gives you the entire story of the *Powermaster* packaged automatic boiler. Just drop us a line and we'll put one in the mail for you.

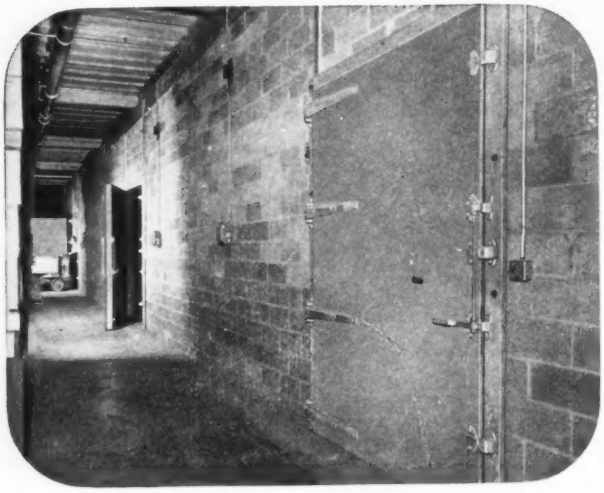
Powermaster®
PACKAGED AUTOMATIC BOILERS
In sizes to 500 HP; pressures to 250 psi

ORR & SEMBOWER, INC. • Established 1885 • **1000 Morgantown Road, Reading, Pennsylvania**

JAMISON doors speed food handling at Grand Union Warehouse



Installation at New Warehouse of Grand Union Company, Carlstadt, New Jersey.



WIDE OPENING FOR EASY HANDLING OF HAND TRUCKS

Exclusive Jamison Adjustoflex Hinges equipped with ball bearings, provide support with easy movement for the 6'x9' Door.

AMPLE HEIGHT FOR PASSAGE OF ELECTRIC TRUCKS

Monopanel construction of door gives greater rigidity and maintains seal.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

Request Catalog No. 3 for details and specifications.
Jamison Cold Storage Door Company, Hagerstown, Maryland, U. S. A.

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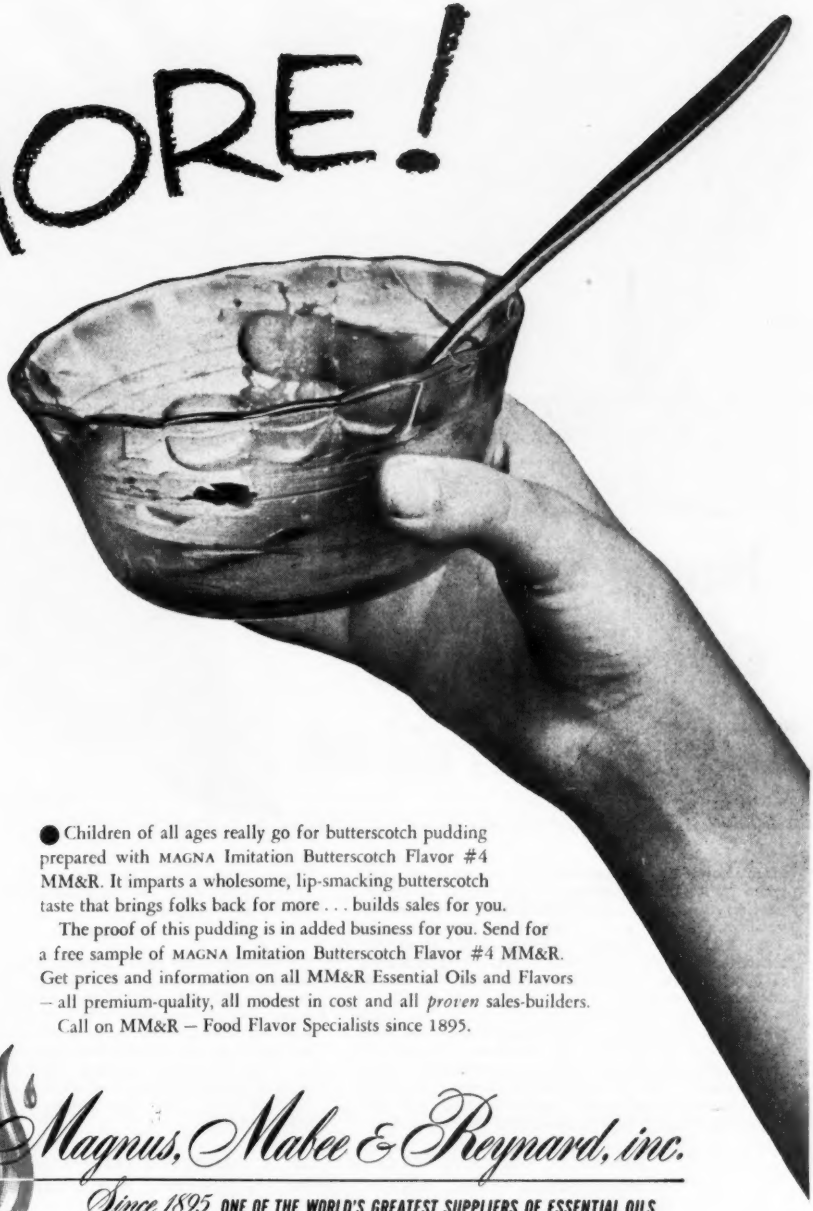

● Children of all ages really go for butterscotch pudding prepared with MAGNA Imitation Butterscotch Flavor #4 MM&R. It imparts a wholesome, lip-smacking butterscotch taste that brings folks back for more . . . builds sales for you.

The proof of this pudding is in added business for you. Send for a free sample of MAGNA Imitation Butterscotch Flavor #4 MM&R. Get prices and information on all MM&R Essential Oils and Flavors — all premium-quality, all modest in cost and all *proven* sales-builders.

Call on MM&R — Food Flavor Specialists since 1895.

Magnus, Mabee & Reynard, inc.

Since 1895 **ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS**

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How a Switch to Chrome Stainless from Ryerson Paid Off

Here's how a Ryerson customer kept his business going when NPA Order M-80 cut off his supply of nickel-bearing stainless. This manufacturer was turning out vacuum tops for coffee dispensers. He was using Type 305 nickel-bearing stainless in his product—thought 305 was the only steel for the job. Restrictions on nickel meant discontinuing production or finding an alternate material.

In his search for an alternate, our customer tried Allegheny Type 430 straight chrome stainless from Ryerson stocks. Results were excellent. The straight chrome steel proved more than just acceptable—it did the job in less time, for less money. Because Type 430 work hardens less rapidly, spinning time was substantially reduced and an annealing operation eliminated. And Type 430 satisfactorily met the finish requirements while costing considerably less than the Type 305 it replaced.

* * *

Perhaps Type 430 or some other straight chrome stainless can solve a problem for you. Only a thorough investigation will tell. We are prepared to help you make that investigation—our staff of stainless specialists is at your service. And we are able to supply the needed steel—our stocks of straight chrome types are the nation's largest and most diversified. Since relief from the nickel shortage is still not in sight, we suggest you act now. Call your nearby Ryerson plant for quick action.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

RYERSON STEEL

RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

NEW WAY of installing tile in this cheese factory spelled end of floor maintenance problems.

Plant Floors That Can "Take It"

Acid-proof tile with resin joints gives 10-yr.-plus life—which may be extended even further by special new techniques . . . Floor's appearance improved, too

RAYMOND B. SEYMOUR

Executive Vice-President & Technical Director, The Atlas Mineral Products Co., Mertztown, Pa.

Recent developments in the technique of tile setting promise to eliminate many of the headaches associated with maintenance of food plant floors.

For they make possible the use of 6x6x¾-in. quarry tile with its architectural beauty, yet provide service similar to that previously obtainable only with industrial type tile installed by bricklayer methods.

Resin Grouting Not New

A little over a decade ago, when techniques were developed for using furfuryl alcohol resins in chemical resistant cements, success was achieved in using these cements for joining bricks in the construction of floors and tanks in the paper, steel, and chemical process industries. And similar construction was applied in food plants.

Such floors consisted of an impervious plasticized asphaltic membrane on which were laid 8¼x4x1⅜-in. tiles buttered on all vertical sides and on the bottom with a furane cement.* They have given excellent service in food processing plants—standing up well over 10 yrs.

However, the prime emphasis in the food industry has been on appearance, and the buttered tile floor lacked the beauty of the customary quarry tile. Also, food plant floors are usually installed by tilesetters, whereas the successful furane floors were constructed using bricklayer techniques.

Several attempts were made to adapt furane cements to tilesetter methods, but with questionable results. In one method, the tiles were buttered with the resin and set directly in a Portland cement bed. In the hands of careful workmen, good results were obtained. However, considerable trouble was encountered when a wet cement bed was used.

* Through an error in technical nomanclature, furfuryl alcohol resin cements became known under the broad term of furane cements.

Furane liquid cements are converted to solids through use of a small amount of acid catalyst. But Portland cement, being alkaline, will prevent this solidification. The zone of soft resin is usually small when the furane hardens in the normal short length of time. However, delays in setting increase the depth of the soft zone. If the area is cold and the Portland cement very wet, the resin may be prevented from setting altogether.

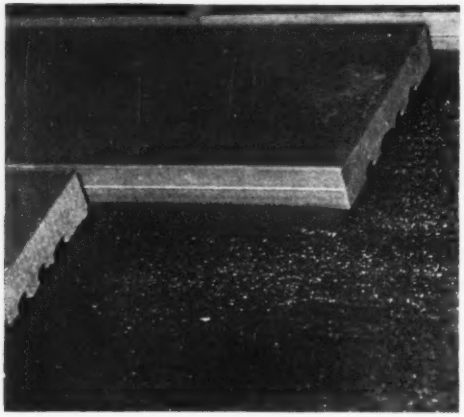
Tilesetters' Method Tried

The universally accepted method for setting 6x6x¾-in. quarry tile is to embed them in neat cement using standard tilesetter techniques. Therefore, consideration was given to a combination method in which the joints between the tiles would be filled with furane. Since, as previously mentioned, this will not set in contact with, nor adhere to, Portland cement, it was essential that the open joint be free from this cement to a minimum depth of ½ in.

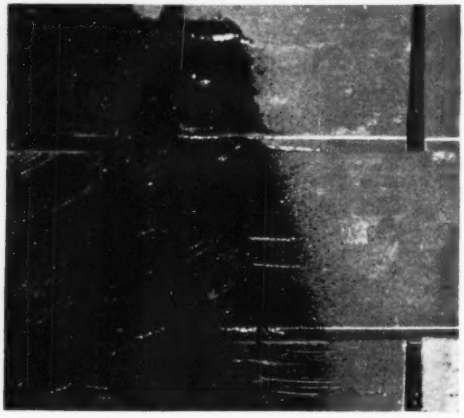
Step-by-Step Procedure in Furane Technique

THIN LAYER of quick-setting resin (left) is troweled on cement slab previously finished to grade.

HOT PARAFFIN is applied to the face of the tile to aid subsequent cleaning when floor is completed.



TILES are embedded in soft resin and pressed or beaten to secure the proper level.



FURANE CEMENT mortar is used to fill joints between tiles. Then a wet trowel is used to strike the joints.

EXCESS resin is removed manually.

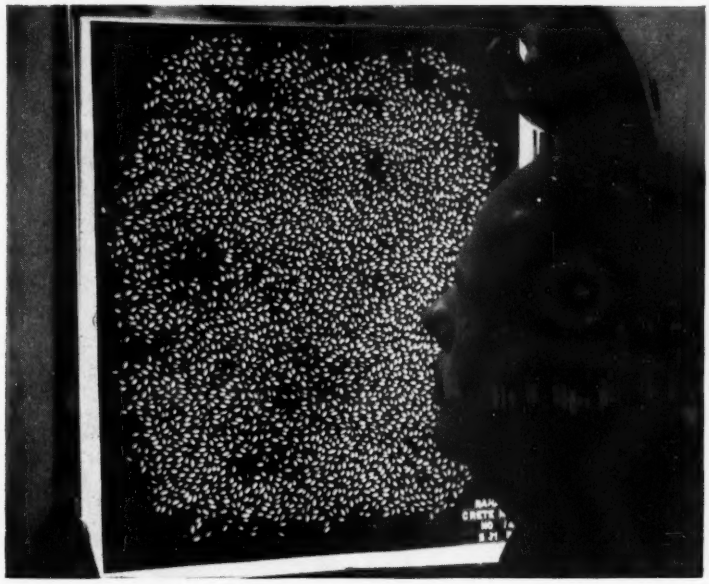
CLOSEUP of completed floor in dairy.

To assure freedom from Portland cement in the vertical joint, and to get the maximum depth of hard furane cement, the open joints were usually washed with weak muriatic acid before being filled.

In the hands of responsible mechanics, hard, flush, serviceable joints were obtained. But this method was not fool-proof. In the absence of proper supervision, workmen might fill the joints with construction dirt or Portland cement to within ¼ in. of the top. This would leave an insufficient depth of the resin. Also, the furane often became contaminated with Portland cement, thus preventing its setting to a hard mass.

Many attempts were made to eliminate Portland cement in food-plant

(*Turn to page 212*)



TO GET QUICK CHECK on grain during peak operations, Author Johnson enters darkroom and views X-ray films while they are still wet, using Duoline illuminator.

X-Rays Spur Infestation Control

New technique provides quick visual and permanent proof of condition of grain . . . Seen leading to more precise standards, less loss in elevators

DR. R. K. JOHNSON
Research Consultant, Crete Mills, Crete, Neb.

Infestation of grain has increased tremendously in recent years, since farmers have drawn away from former natural ways of combatting it when they let grain dry and cure in the field.

Wet years and increasing numbers of "marginal" growers using substandard bin-storage methods have not helped the situation. All these factors have contributed in making insects a greater cause for alarm.

So to meet this situation, mills, county agents, grain improvement groups and schools in Nebraska, Kansas, and Minnesota have taken the lead in tackling the problem from its two ends—fumigation of bins and elevators and the employment of new and better methods for detecting insects and grading grain when it is delivered at the mills.

Initial studies made at Kansas State College* pointed to X-ray as the ideal means for detection. Hence, when one of the first G.E. commercial units became available, our company, Crete Mills, of Crete, Neb., put it to work with two purposes: (1) Positive identification of hidden insects in incoming grain, and (2) more accurate counting of infested kernels. And there was the eventual goal of setting up more precise grading standards.

Use of the new unit now makes it possible for us to reject grain that appears sound but is actually infested and, also, to periodically spotcheck an accepted grain that is stored and turned in its bin.

But, more than that, X-ray has shown the infestation problem to be considerably worse than was commonly thought up to now. Our X-ray laboratory is finding more hidden infestation than was previously revealed by the cracking flotation method—and, of course, considerably more than can possibly be seen by the naked eye.

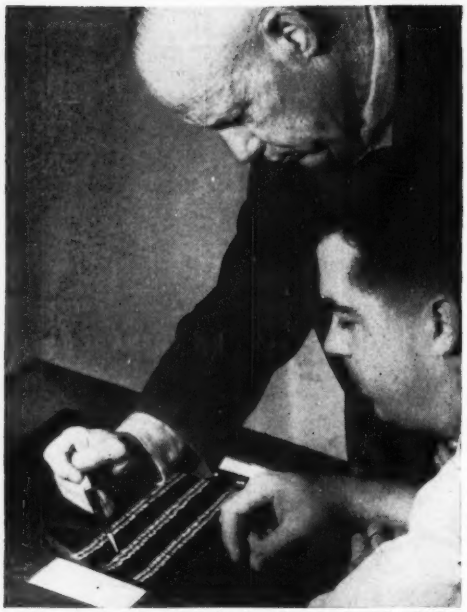
Until the advent of the new machine, it was a long, tedious, and inconclusive procedure to determine whether there were or were not insects *hidden* inside of grains. To be sure, if one probes into a badly infested carload, he can usually pull out visible evidence of weevils. And the presence of even three visibly infested kernels in 100g. is considered grounds for rejection by F&DA officials.

That, however, is not getting at the real problem.

Unfortunately, the weevils and other insects go through their egg and

* By Max Milner, M. R. Lee, and R. Katz, with the aid of Millers National Federation.

GRAIN sample is poured by Crete President Ben Johnson onto glass holder fitted above unit's X-ray tube. Next, he will close lid (left) containing X-ray film, and "shoot."



FILM of artificially infested wheat is examined by Author and Technician DuBois. Crete is circulating such reproductions to other mills with view of setting up standards.

larval stages in complete privacy within the berry of wheat or kernel of corn. They then have the habit of eating their way out when they become young adults. The real problem, then, is detecting these insects in their hidden, juvenile stage.

To solve this problem, G.E. engineers came up with the special X-ray tube, having a beryllium window (exit port for the X-radiation) which allows escape of the "soft" or non-penetrating rays that are normally absorbed in the glass of the tube. These rays, because of their relatively long wavelength, are ideal for differentiating between grain and weevil structure, or between grain and cavity areas.

So clearly do the infested areas stand out on the X-ray films, when viewed on illuminators, that laboratory technicians with no X-ray experience can be trained to interpret the films and render a "diagnosis." The equipment required is minimal—a compact machine resembling a small apartment-sized cooking range (only 35 in. high by 20 in. wide by 24 in. deep, and weighing but 140 lb.) It contains built-in shielding to protect the operator from all radiations.

Functionally, the X-ray tube—located in the base of the cabinet—shines up through a tray of grains and exposes the film placed over the sample. Self contained and shockproof, the apparatus operates at from 15,000 to 25,000v. and 0.005a., working from an ordinary 100/130v. 60-cycle current source.

In actual operation, a 100g. sample is merely poured onto a thin plastic tray at the top of the machine, and the unit lid—containing the film—is closed down over the sample. Then, with the controls preset for exact time, amperage, and voltage, the exposure button is pressed.

After exposure, the film—shielded from light by its holder—is passed into a darkroom. Here, a small three-compartment developing tank, a red safe light, a few hangettes to hold the film, and an illuminator for wet-viewing of "rush" films, are all the equipment needed to complete the analysis of the grain.

The whole procedure for obtaining dry film requires about 1 hr. But while

Action!

XLD 102 CHGO MILX 20
LLOYD E SLATER, FOOD ENGINEERING
CHICAGO OFFICE, 520 N MICHIGAN AVE

US FOOD & DRUG ADMINISTRATION JUST ANNOUNCED NEW GRAIN INSPECTION PROGRAM BASED ON HIDDEN AS WELL AS VISIBLE INFESTATION. NEBRASKA GRAIN DEVELOPMENT ASSN SAYS WILL REVOLUTIONIZE HANDLING OF WHEAT AND OTHER FOOD GRAINS. ENFORCEMENT DOES NOT EXTEND TO FARM LEVEL UNLESS FARMER SHIPS GRAIN INTERSTATE BUT DOES AFFECT MILLS. COUNTRY ELEVATORS AND TERMINAL BINS WILL HOLD FOR FURTHER EXAMINATION AND POSSIBLY DECLARE UNFIT FOR HUMAN CONSUMPTION ANY GRAIN WITH TWO OR MORE WEEVIL EXIT HOLES IN ONE-FOURTH PINT SAMPLE. CAN TAKE COURT ACTION AGAINST OWNER. WEEVIL-FREE WHEAT OF GOOD QUALITY EXPECTED TO COMMAND 50-CENTS-BUSHEL PREMIUM OVER UNFIT GRAIN.

DAVE GOODMAN
GENERAL ELECTRIC CO XRAY DEPT
MILWAUKEE, WIS

one film is being developed, other samples of grain can be exposed to X-ray. Thus, during rush periods and at the height of the delivery season, seven or eight samples can be processed per hour.

Other Methods Tedious

Contrast this procedure with the only other method for inspecting wheat samples that has been used with any degree of success here at Crete—cracking flotation. One laboratory man working full time can only handle eight samples at a time and each test takes 3 *hr.* to yield the insect fragments minus the wheat, wheat oil, and other non-insect particles.

Moreover, after separation these fragments must be carefully examined under a microscope. And more often than not, the insects are so pulverized in the cracking process when the sample is ground up that the inspector has no assurance of how many weevils he has missed. He must tediously "reconstruct the crime" from the meager evidence at hand.

Cracking flotation involves the following steps: (1) Pouring grain from a liter beaker into the grinder and adding water to the ground up samples; (2) boiling for 10 min.; (3) decanting the top off into a trap glass; (4) allowing the residue to stand until the oil comes to the top; (5) decanting this off into another glass; (6) filling the glass again and once more separating the oil from the solid residue; and (7) digesting the starch and wheat residue with dilute HCl, floating more oil off, and pulling the insect residue out of the flask by suction and onto a filter paper so that it can be studied microscopically.

In our current setup, both the X-ray and cracking-flotation techniques have been performed by our laboratory technician, Donald DuBois, who finds the new X-ray method "a pleasant release."

Other methods of gaging infestation are employed by some mills. The staining technique, using berberine sulfate, has been found wanting in that it reveals only the plugs or entrances through which the adult female deposits eggs in the wheat berries and then re-seals.

The recently announced flotation method, which uses ferric nitrate, is said to reveal only those berries with exit holes or those containing adults. Thus the sample may be in the early stage of infestation and go undetected. Depending, as it does, on differences in specific gravity, this method is subject to all the vagaries of any test which does not allow for variations *within the normal* and, consequently, it might produce false positive and false negative results.

Some corollary advantages of the X-ray technique have appealed to us. First of all, it provides visually indisputable and, therefore, legal proof of the condition of a sample of grain. Also, it shows the exact stage to which insects have developed and thus permits checking on the efficiency of bin fumigation. Further, it reveals damage other than insect infestation—i.e., "checking" and germ damage in wheat and corn.

An unusual benefit has been use of the unit as a sales promotion tool. Our enthusiastic salesmen, in calling on bakers and retail dealers, point with pride to the fact that their wheat is "X-ray" graded."

As a matter of fact, so effective is the new method in revealing grain structure that it also promises future value in general agricultural research, in entomological experimentation, and as an educational tool in promoting fumigation of bins.

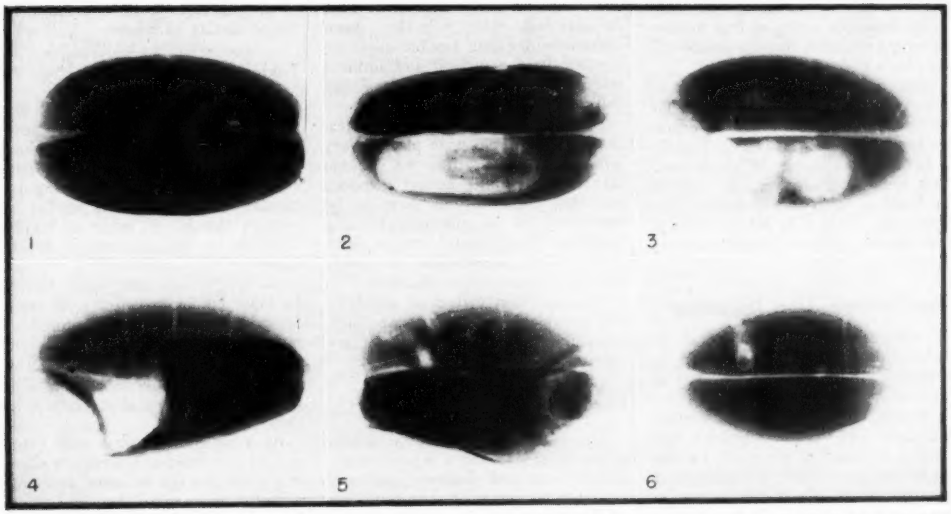
New Standards Possible?

The best incentive for bringing about universal fumigation practices is for farmers and elevator operators to know that the miller now has a positive method for testing and grading grain. And yet, we do not like to reject or down-grade grain. Therefore, it certainly is to everyone's interest to work with governments, schools, and trade associations in promoting practices that will cut down the extent of infestation. We're all in the same boat.

There is strong evidence that gov-

(*Turn to page 168*)

What X-Rays Show



SAMPLE "SHOTS" demonstrate detection. Interpretations, following (1) Normal wheat kernel, are: (2) Mature weevil ready to come out, (3) Kernel broken after adult weevil has emerged, (4) Unplugged hole left by female weevil disturbed when egg laying, (5) End view of plug (material that female weevil fills in hole bored after deposit of egg), and two hatched larvae (eggs), and (6) Weevil larva (longitudinal view in hole plugged by female).

"Spelling Out" Carton Specs

Boosts Output, Bars "Bugs" on the Line

Here are time-saving, cost-cutting "ways and means" taken directly from successful food-plant practice to help you order your materials properly

FE STAFF

No packaging line can operate efficiently unless it receives containers or materials that are free from defects. For packaging machines cannot maintain a scheduled production rate when faulty stock interferes with the smooth performance of automatic operations.

To obtain maximum production-line efficiency, with minimum downtime and rejects, prime requisite is careful establishment of adequate specifications for each packaging material or container.

These specifications must take the supplier's manufacturing problems into consideration—so it is important to adopt trade tolerances that are in accord with the recognized practice of the industry producing packaging materials.

Specifications should not be drawn up without the cooperation of the supplier of the packaging materials. They should be set up so that production runs smoothly in both plants—the supplier's and user's.

But drafting proper specifications for packaging materials is not the whole answer to assuring maximum packaging-line performance. Equally a factor is the matter of seeing to it that there is always enough material on hand to keep the packaging lines operating. This calls for an efficient ordering as well as inventory-control system.

Poor Packages, More Inspecting

In addition to causing difficulties on production lines, defective packaging materials entail a considerable loss of time in inspection of stock.

Assume, for example, that cartons cut from one of the supplier's dies cannot be handled efficiently on the packaging line. Then a worker must be detailed to inspect the cartons in every shipping case. If the trouble has been traced, say, to die No. 1, all cartons printed with this number on a flap must be sorted from the others. Only cartons free from defects should be run on the packaging lines.

At the end of normal runs, attempts should be made to use the poor cartons at slower speeds by making the necessary adjustments on the machines.

We will cite a few examples of difficulties to be expected on packaging lines due to faulty packages.

Suppose that the caliper (thickness of paperboard) is out of line. The cartons will then cause jam-ups, jack-knifing across the belt feeding them to the forming mechanism.

Improper-size cartons also create trouble on the line. If they are too large—hence tight for the forming blocks—they cause jamming. In some cases, vital machine parts may be damaged, especially on the double-package maker.

Excessive moisture in the paperboard may produce curled or buckled cartons. The latter will slow down operations, creating trouble all along the line—at the pick-off and forming stations as well as at the glueing and closing units.

Now about setting up specifications: Suppose you were placing your initial order for cartons to package starch-type pudding dessert powders, and that these cartons were to be assembled on an automatic forming machine. How should you go about drawing up specifications to obtain maximum production efficiency?

After working with your suppliers, you should be able to issue specifications like the one on the accompanying page.

Checking and Rejecting

The quality control division of your plant should secure a representative sample from each shipment and carry out examinations relative to condition of the materials, caliper of the board, and also size, moisture content, and bending properties of the cartons. Inspectors should also check cartons for evidence of nicks, fuzz, and foreign odors.

If the sample does not fully conform to specifications, then a decision as to what action should be taken must be made by the director of research and quality control, after consultation with production and purchasing departments.

A quantity check should also be made by check-weighing approximately 1 percent of each shipment and spot-counting various tiers of cartons.

Rejection and spoilage reports covering all unacceptable materials received should be prepared by the quality control division. Similar reports on losses incurred by the company in running defective materials on the packaging lines should be made by the production department. Then the receiving department should notify the accounting and traffic departments of all rejections due to damage incurred during shipment.

Taking Inventory

As a cushion against strikes at suppliers' plants, adverse weather conditions, and other emergencies, food processors should always have on hand a sufficient inventory of packaging materials. A physical check of the inventory should be made at regular intervals by the production department.

To save warehousing space and to facilitate taking inventories, all packaging materials should be stored on pallets. And all pallets should hold the same number of cases of packaging materials. Only exceptions: The last few pallet loads of a specific shipment.

As a safeguard against such emergencies as a strike at a supplier's plant, it is good practice to order packaging materials from more than one manufacturer. What's more, accounts will thus be kept competitive in respect to service and to the quality of the packaging materials.

Typical Package Job Detailed

PACKAGING SPECIFICATIONS

Item: Printed, flat, glued, folding carton.

Size: 2 7/8 x 1 1/4 x 4 3/8 in.

Style: Full seal-end carton with 1/2-in. glue flap.

Purpose: To serve as a container for starch-type pudding dessert powders. Carton to be assembled by automatic machine. (state make.)

Requisites: 1. Board must be patent-coated newsback stock. It should have excellent bending properties and, when scored, it should withstand 180-deg. folding in direction from which it is creased without visible cracks or fractures on outer surface.

2. Carton should have a full seal end, with $\frac{1}{2}$-in. glue flap.

3. Scoring must be sharp, well defined, and aligned with knife cuts. Scoring should be uniform and of such depth as to prevent surface breaks in the paperboard, either when creasing or when filling and sealing cartons.

4. Knife cuts must be clean (no fuzz) and free from nicks.

5. Caliper should be 0.018, $\pm$0.001 in.

6. Board should weigh 77 lb. per 1,000 sq. ft., $\pm$3 percent.

7. Maximum moisture content of paperboard at mill must be 5 1/2 to 6 percent.

8. Board stiffness should measure (on Faber instrument V-5) M.D. (machine direction) 500, and C.D. (opposite direction) 100.

9. Water drop test: 100 sec. maximum on back liner and 5 min. maximum on top liner.

10. Grain should run lengthwise.

11. Finish of board should be No. 3.

12. Cartons must be free of foreign odors. Odor trouble results when board is manufactured under poorly controlled conditions, such as where rinse water is continually used without cleaning and so imparts offensive smell to board. In turn, these odors may contaminate foods packaged in the cartons.

13. Each order must be keyed to a blueprint and not to a previous order.

14. Each carton must have die-form number on a flap.

With cartons numbered in this manner, inspectors can set them aside in event they cause trouble on the line, and then check them for variations from specifications.

15. Maximum spoilage due to faulty carton manufacture must not exceed 1 percent, calculated on basis of entire purchase order.

Reasons Constituting Rejections: 1. Material not conforming to specifications.

2. Cartons that form "out of square", or with flaps projecting over edges.

3. Measurements outside of 1/32 in. tolerance.

4. Material indicating exposure to excessive moisture.

5. Improper packaging of materials.

Packaging: 1. Individual cartons must not be tied with cord or paper bands.

2. Cartons must be packed in uniform-size cases. Total weight of any case must not exceed 50 lb.

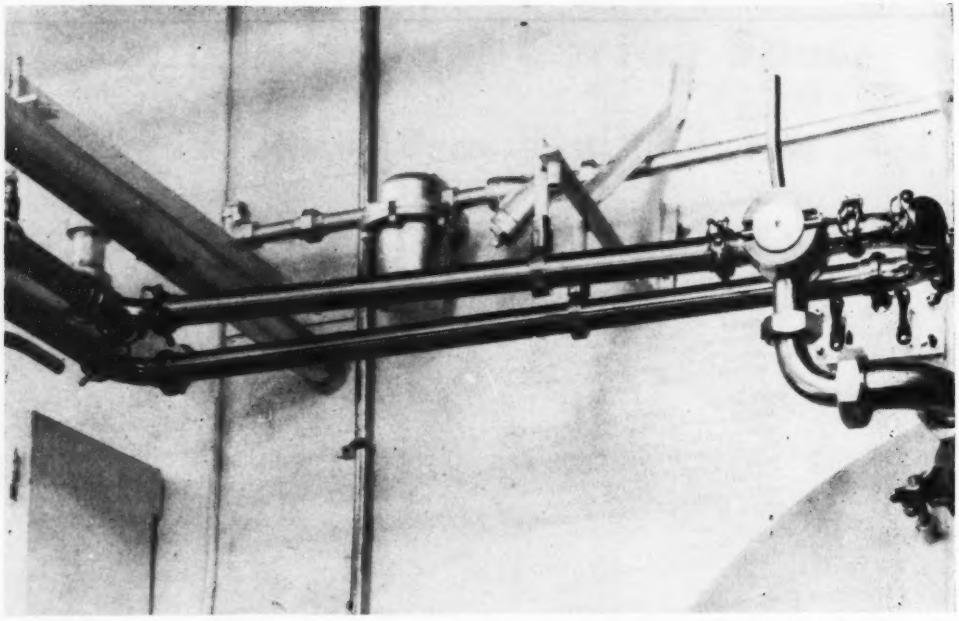
3. Each tier of cartons must be separated with a paperboard pad, and there should be a divider between each row.

4. Cartons must be packed upright in cases.

5. Corrugated shipping cases must meet minimum requirements of Rule 41, Consolidated Freight Classification. Cases must be 200-lb. test board, regular slotted carton style, with top and bottom paperboard pads.

Marking: The following information must be legibly stenciled or stamped on each corrugated case: Quantity in case, size of carton, lot or order number, date, and manufacturer's name.

Shipping: All shipments must be made in dry, clean trucks or box cars to assure arrival at plant of undamaged cartons free of excessive moisture and objectionable odors.



TWO pipelines feed raw milk to storage tank (right). For cleaning line in place, three-way valve is set in straight-through position.

Tips on Designing and Operating

Cleaned-in-Place Pipelines

Lines should slope 0.05 in. per ft. Tanks, vats, and open equipment are to be bypassed. Circulating unit ought to create velocity of 5 ft. per sec.

H. P. HODES

Development Engineer, Tri-Clover Machine Co., Kenosha, Wis.

What is a successful CIP (cleaned-in-place) pipeline?

It is one that—

- **Effects a substantial saving in cleaning labor.**
- **Lowers maintenance and material replacement costs.**
- **Eliminates human errors.**
- **Gives sanitary results that are as good or better than attained with the old take-down method.**

To insure maximum operating efficiencies, careful plans must be made in the beginning.

Not only is it necessary that provision be made for a wide variety of products to be run through the line in either direction, but the line must be easily converted for the circulation of cleansing and sanitizing solutions through it.

Successful operation of this system depends upon the following basic design rules:

1. All horizontal piping must be sloped for drainage of products and cleaning solution. Sanitary engineers recommend a minimum pitch of 0.05 in. per ft. However, 0.125 in. or greater is preferable. In very long lines where a continuous slope is impossible, several drainage ports must be installed at intervals along the pipelines.

2. All side lines, vats, tanks, and equipment which are not a part of the CIP circuit should be cleaned by brushing. Therefore, provisions should be made to bypass these units with auxiliary lines. Naturally, elimination of dead-ends will result in an easier and better operation.

3. An average flow velocity of not less than 5 ft. per sec. should be maintained through the cross section of the largest pipe or fittings to be cleaned. Studies should be made of the proposed layout to determine that the velocity will not be slowed too much by these factors: length of the line, elevation, number of fittings, and auxiliary equipment being cleaned. Equipment such as surface coolers and surge tanks, which do not maintain a

TABLE—TIMES REQUIRED to fill 10-Gal. Can at Flow Rate of 5 Ft. Per Sec.

Pipe Size, In. O.D.	Flow Rate, Gal./Min.	Sec. to Fill 10-Gal. Can
1	10	60
1½	24	25
2	43	14
2½	69	9
3	101	6
4	180	3½

back pressure, *should not be included.*

The circulating unit is the heart of the system. It consists of a motor-driven pump and a solution tank. Both should be made of stainless steel, or an equally non-corrodible material.

Points in Effective Cleaning

Good results have been obtained by using surge or dump tanks which are handy to the pipeline as the cleaning solution tank. Even more satisfactory, however, are a separate tank and pump which are used only for cleaning purposes. An excellent unit is made by mounting both pump and tank on a flat sheet of steel provided with castors and a handle. It can then be stored in an out of the way corner when not in use.

The circulating pump should have sufficient capacity to provide an average velocity of 5 ft./sec. in the line. Times required to fill a 10-gal. can with water traveling at this velocity through pipes of different sizes are listed in the table accompanying this article.

To effectively clean pipe lines in place, it is important that the solutions maintain complete contact with the inner pipe surfaces. To accomplish this, the line must be free from air. It is desirable, therefore, to provide a solution tank having a capacity greater than the volume of the line being cleaned.

In long, vertical falls, a controllable restriction is necessary to maintain suitable back pressure.

In large operations where the capacity of the solution tank is less than that of the pipe circuit, it is advisable to provide automatic means for continuous addition of water and cleaners throughout the filling period.

Where Do We Begin?

There are several good starting points for determining which lines are to be cleaned in place. First, take a look at all long lines. If these already run in pairs, so much the better. If not, a second or return line can be added for recirculation. Provision should be made, however, for connecting these lines in series for the cleaning operation.

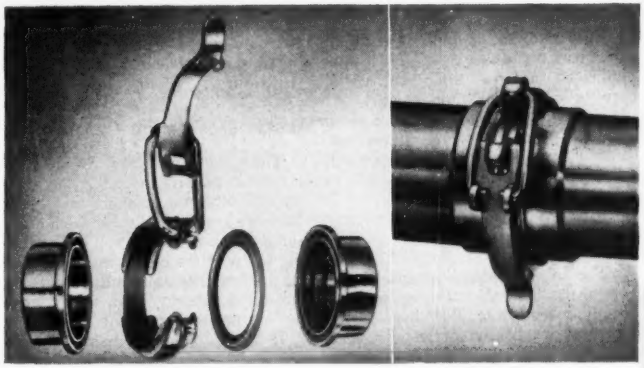
In many plants, an excellent cleaning circuit can be made by using the HTST pasteurizer, plate cooler, or tubular heater as the starting point. It is desirable, and in most instances common practice, to clean these pieces of equipment by recirculation methods.

In the HTST pasteurizer, for example, pipe lines conveying raw products lead into the unit, and lines transporting pasteurized products lead from the unit. It certainly is practical and economical to clean these lines in conjunction with the HTST unit. The internal pressure drop of this equipment must be determined. It should not be so great as to reduce the flow rate of the recirculated cleaning solution.

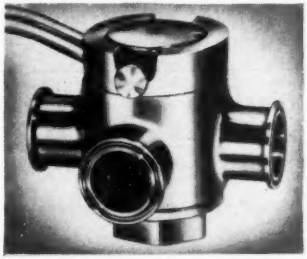
Lines leading to a multiple filling operation are easily converted to CIP by use of auxiliary or jumper pipes. Take, for example, an operation using four fillers, with a sanitary line feeding each machine by gravity. To clean these lines in place, two auxiliary lines are connected so that the cleaning solutions are pumped forward through the first line, back through the second, forward through the third, and returned to the solution tank through the fourth.

In large operations where many

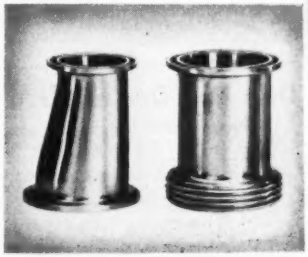
New Fittings Speed CIP Erection



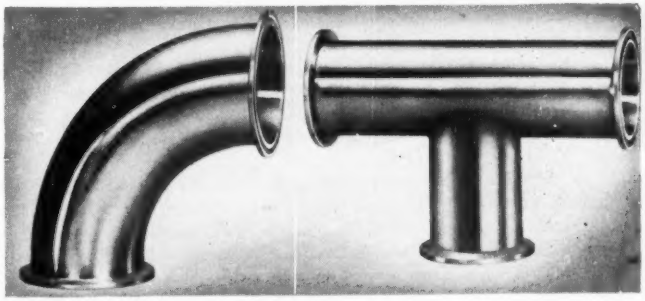
CLAMP COUPLING is comprised of two recessless expanding ferrules, a molded gasket, and snap-action clamp. Right: Coupling in action.



SANITARY VALVE features automatic, cam-action lift plug that cannot stick or gall, and grooved lips that automatically align gaskets.



STREAMLINED eccentric reducer (left) for horizontal pipelines permits complete drainage. Right: Adapter for connecting CIP to 3A fittings.



ELBOWS AND TEES are fabricated with clamp ends to simplify installation.

products are being processed in one or more machines, diversity is the objective, and timing is important in order to rinse and clean the line as soon after processing as possible. Where these conditions exist two or more separate CIP circuits can be made.

Lines that feed a battery of storage tanks, pasteurizers, or cheese vats can be circuited quite effectively by using three-way valves at each vat entrance. During cleaning, valves are set in the through position, and an auxiliary line conducts the solution back to the recirculation unit.

For diversity, complex manifold systems have been worked out by the judicious use of three-way valves, crosses, and short pipe lengths. As long as the manifolds are composed of even numbers of lines, recirculation cleaning is easily accomplished. An odd number of lines necessitates the use of an auxiliary pipe.

New Fittings Designed

The inherent disadvantages of the use of the conventional union nut and ferrule assembly for CIP lines led to the first installation of an all-welded stainless steel line in Washington, D. C., in 1948. Soon after its installation, other welded lines appeared in milk plants on the West Coast.

Chief advantage of this type of pipe construction is the continuous, smooth internal surface. However, the high cost per joint has spurred the development of efficient, economical pipe joints for CIP lines. The costs referred to are for welding and grinding, making pipeline changes, and excessive cleaning labor involved in hand brushing "dead end" capped crosses at all turns and at every 40 ft. of pipe length.

To design a good joint for CIP lines, many new features must be incorporated. First, it must be constructed so that the gasket is automatically and positively aligned in the closed joint assembly. This eliminates the dam-and-gully situation which is so common to conventional joint construction.

Gasket Requirements

The gasket, itself, must be made of non-toxic material which is relatively fat and moisture resistant and which forms a substantially flush interior surface with the inner wall of the tubing when in the closed position. The joint must be sufficiently strong to withstand ordinary strain so that crevices do not appear at the gasket.

It is desirable to design a joint which is visibly different from the conventional sanitary line so that accidental tampering will be less apt to occur.

The accompanying photographs show what has been done about this problem. The uniqueness of the joint is the method by which the two ferrules are held together—a simple clamping device.

First conceived by a West Coast manufacturer, this clamp was originally squeezed together with a bolt and nut. By a simple modification, the bolts were replaced by a quick-acting toggle clamp. Advantages of a clamp are obvious. An even, controllable pressure is exerted on the gasket sufficient to seal it from leaks. But the pressure is not great enough to cause cold flow and an inside dam. The snap action makes assembly easy. And where tampering might occur, a short toggle is used. This is practically impossible to open by hand. Yet a special hand tool opens it easily.

These CIP joints are easily adapted to existing sanitary 3A equipment by expanding-clamp ferrules on one end of a piece of tubing and 3A ferrules on the other.

Proper Supports Essential

Once installed, these lines involve no depreciation cost other than for gaskets and obsolescence. So the original expense of the material becomes insignificant—providing proper care has been taken to support and protect the lines from damage.

Be sure that all CIP lines are out of the way of all production activity. For best results, each pipe section should be supported by two hangers, one about a foot from each side of the joint. When running the pipeline through a traffic area is unavoidable, guards should be used. These can be made of expanded metal, sheet metal, wood, or any handy material that offers sufficient protection.

4 Cleaning Tips

Here are several points which should be emphasized in cleaning a pipe line in place:

1. Give the line a turbulent rinse with warm water (100-120 deg. F.) as soon as possible after processing is completed. This is the most important part of the cleaning operation, because it properly prepares the line for chemical cleaners.

2. If chlorine is to sanitize the lines, do not circulate it until immediately prior to the milk run. And do not allow the chlorine to remain in the line any longer than is necessary for doing the job.

3. Be sure that chlorine-treated valve plugs are dry before they are put back into the valve body. This reduces the possibility of corrosion.

4. Do not pump a sponge through

(Turn to page 212)

Do's and Don'ts for CIP Pipelines

1. Plan installation from a good, accurate drawing, then keep it handy for reference and changes.

2. Pitch all horizontal piping at least 0.05 in. per foot.

3. Specify streamlined reducers. And use eccentric reducers on horizontal lines installed with straight side on bottom to permit drainage.

4. Do not run a straight line from fixed port to fixed port without expansion loops.

5. Install pressure-relief valves at the head of all positive-displacement pumps.

6. Do not use positive-displacement pumps for recirculating cleaning solutions. Prolonged exposure to acids and alkalies reduces their efficiency.

7. Tag all recirculation pumps with motor rpm., gpm., and head. Denote on which circuits pump can be used to deliver a flow velocity of at least 5 ft. per sec.

8. Assure full surface contact of cleaning solutions by providing controllable restriction on exit end of line.

9. Do not include equipment that will reduce pressure of cleaning solution.

10. Install recording thermometer, with bulb located near exit end of circuit.

11. Accurately determine pressure requirements of complete circuit, including static and dynamic friction heads. Miscalculations can result in burned-out motor or insufficient flow velocity.

12. Do not install thin-wall or unpolished tubing. Either ultimately will cause trouble and will result in very little cost reduction.

13. Do not use old, dented tubing. Each dent is a dam which creates puddles.

14. Only chemical resistant materials should be used throughout. White-metal alloys corrode, and electrolysis occurs between dissimilar metals. Stick to old reliable 18-8 stainless steel.

DOUGH PUMP Saves Labor, Is Sanitary

Midwest biscuit maker boosts sanitation, cuts handling costs, with novel air-operated pump—moves dough direct from trough to oven

FE STAFF

FINAL SHOVELFUL of dough is moved to feed end of pump. Half-full 10-ft. trough will soon be replaced with deeper 5-ft. units which hold dough to top level.

Some food materials still persist in being scooped, poured, shoveled, tossed, etc., during transfer in process. True, many of these validly defy mechanized techniques—but many, also, continue to be manhandled because its a "taken-for-granted" way to do the job.

Cookie dough is a good example of a traditionally man-handled product. Yes, this material is delicate, and violent action can influence results in depositing. But the Salerno "Megowen Biscuit Co., Chicago, recently decided to over-ride tradition and try an interesting air-operated piston pump that had been solving vaguely analogous problems elsewhere. Today, the trial unit is not only at work full time, but has—

- **Reduced vanilla wafer dough transfer from a 2-man to a 1-man job.**
- **Resulted in better finished goods due to noticeably improved bottoms.**
- **Vastly upgraded the sanitation of the operation.**

Formerly the company moved its cookie dough to the depositor location in half-filled 10 ft.-long mobile troughs holding about a barrel and a half of dough. Two men, leaning over the trough in sequence, picked up the dough by hand and inserted it into the high depositor hopper. Emptying took about an hour.

Not only was this job back-breaking and messy, but it required a fair amount of juggling skill on the part of attendants to keep each amorphous armful intact.

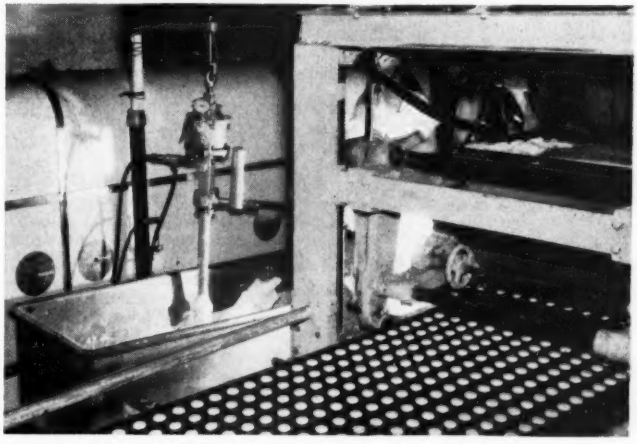
It was about two years ago that the company decided to do something about this operation and, not being aware of any suitable device on the market, proceeded to design and build a pump to handle the job. However, it was an elusive problem to solve, for every approach led to undesirable churning of the product in transfer. This over-mixing caused the goods to deposit non-uniformly and resulted in oval-shaped cookies.

Then, about a year ago, a company official spotted a pump made by the Alemite Division of Stewart-Warner, which was being used to spray troughs with grease directly from the barrel and which appeared to have a similar potential for handling lard in the bakery.

Bike-Pump Principle

The unit in question was a compact assembly that clamped on the side

(Turn to page 170)



VANILLA WAFER DOUGH is automatically sucked out of trough and introduced into depositor hopper (right). Permanent stainless steel pipe will soon be substituted for hose, and sanitary enclosure cover will go on hopper.

REFRIGERATION "PACKAGE" is quickly rolled into convenient compartment housing two units. And it can be replaced inside of 15 min. Crank (left) easily moves unit out on its track.

Perishables Upgraded, Distribution Sped With

Mechanical Refrigeration on Rails

What's more, units are so compact that cargo space is notably increased. And temperature control within 2 deg. F. is cited

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Progress in food transportation is getting a substantial boost by the fast-growing use of mechanical "reefers" in rail transit.

Robert R. Young, well known railroad president, summed up an urgent need for this development when he said at the fifth anniversary dinner of the Federation for Railway Progress:

"Is it not strange in this fourth decade of mechanical refrigeration that refrigerator cars still depend upon icing stations—needless delays to perishables, for icing and de-icing, of hours, sometimes days? Corrosive brine drippings from melting ice shortens the life of cars, culverts, bridges, rails, and ties. Temperature variations result in damage claims.

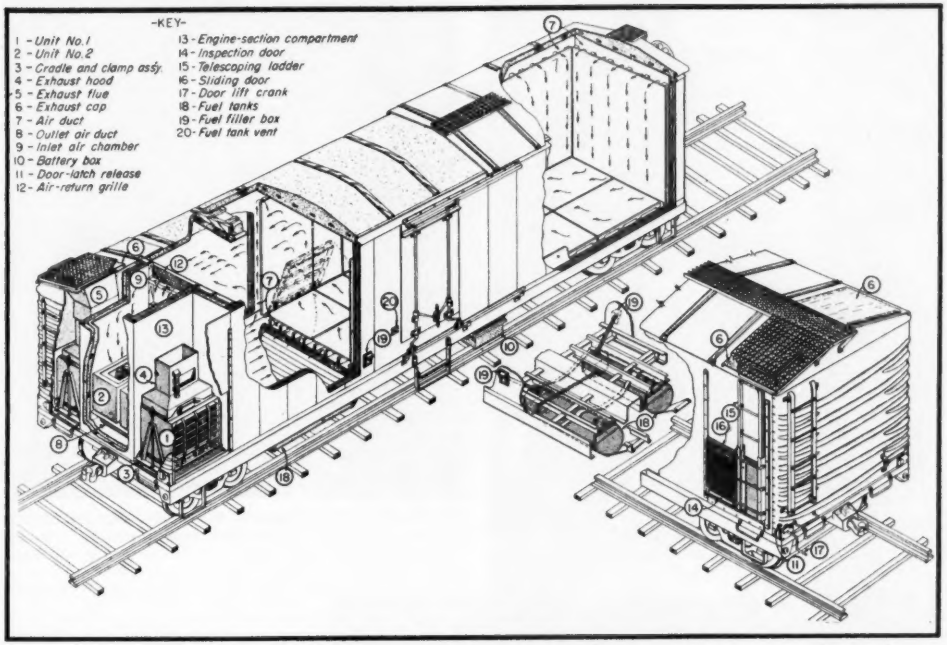
"The cost of favoring ice reaches untold millions annually. On eleven western railroads, where these icing delays are most important, sixth morning delivery of West Coast perishables into Chicago is uniformly adhered to, although fifth morning delivery would be easy, and fourth morning should be the goal."

With the development of mechanical refrigeration in trucking, food processors began to share this viewpoint and rail traffic suffered, with more and more hauls of perishables going by motor. But in the past two years, mechanical reefer cars have been put in service with a success that bids fair to establish a new shipping balance.

While only about 200 railroad cars have been thus far equipped with mechanical refrigeration — most on frozen food runs—there was a major boost to the trend when John Morrell & Co., Ottumwa, Iowa, recently placed 25 units in service between its Midwest plants and the South (FE Aug. p 209).

As the first meat packer to adopt

Inside Facts of System


-KEY-
1 - Unit No. 1
2 - Unit No. 2
3 - Cradle and clamp assy.
4 - Exhaust hood
5 - Exhaust flue
6 - Exhaust cap
7 - Air duct
8 - Outlet air duct
9 - Inlet air chamber
10 - Battery box
11 - Door-latch release
12 - Air-return grille
13 - Engine-section compartment
14 - Inspection door
15 - Telescoping ladder
16 - Sliding door
17 - Door lift crank
18 - Fuel tanks
19 - Fuel filler box
20 - Fuel tank vent

CAR LAYOUT illustrates compactness of space occupied by mechanical units. Actually, 16 percent more cargo space is available than in ice-bunker "reefer." Arrows show path of chilled air from under floorboards over cargo.

the technique in rail transit, Morrell based its move on results with its fleet of refrigerated trucks and data from a tough test car run through extreme temperatures carrying a full load of meat.

Today, with its new meat-moving rail fleet in full service, the company reports a marked upgrading in quality of its southbound goods.

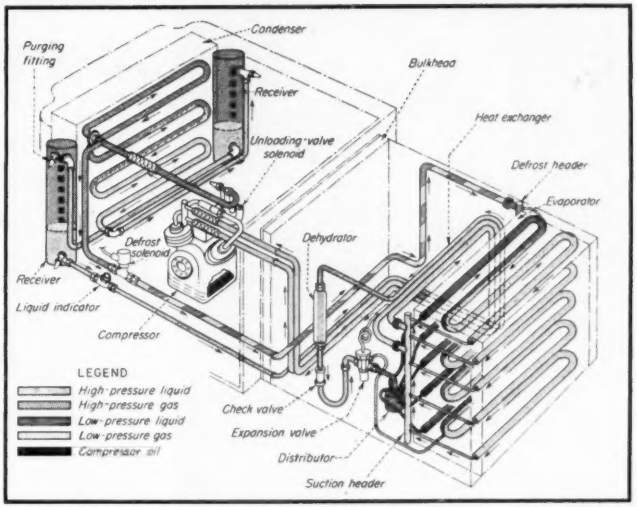
It has achieved: (1) Speedier movement of goods from packing house to branch warehouse, (2) cargo temperature control to within 2 deg. F. in transit, and (3) excellent in-car humidity conditions.

Now, about the engineering:

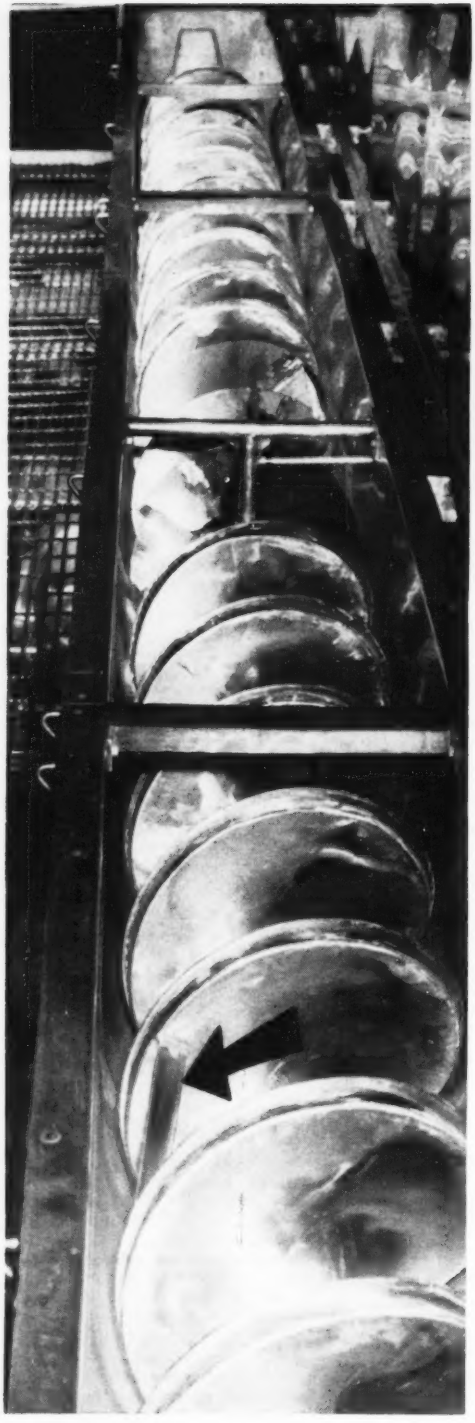
In working out its program, Morrell went to the "packaged" type refrigeration unit—provided by the Thermo-King Railway Corp., of Minneapolis—which was similar to the set-up used in its over-the-road trucks. This equipment firm had already proved the utility of its rail unit with installations for milk shipment in the east and frozen foods in the west.

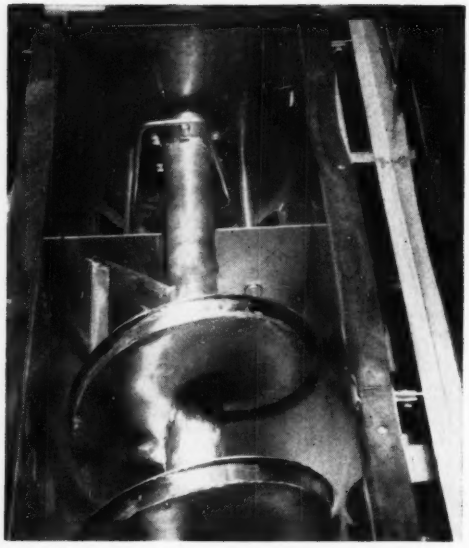
Setting up a railroad car for mechanical refrigeration, however, involves unique problems not found in trucking. For one thing, no attendant is on hand during the trip to be sure that the unit is functioning properly. This requires excellent design in system stability, automatic features, and safeguard devices. Also, should the need arise, the services of a mechanic cannot be

(Turn to page 153)



REFRIGERATION CYCLE shows how compressor is isolated from evaporator coils. Note defrost valve that sends hot gas to evaporator in heat cycle. Expansion valve is controlled by bulb—seen soldered on suction line—acting against pressure exerted from tap in evaporator coils.





CLOSEUP VIEW of exit end shows new weir installed to act as a dam for maintaining proper product level in shell, preventing scorching. For the more viscous materials, weir may be moved backward to allow product to drop more freely into collector screw, directly underneath this exit opening.

PROCESS SCREW Aids Beech-Nut

Company's engineers adapt it for blanching fruit-and-vegetable baby foods—and get immediate rise in output and quality

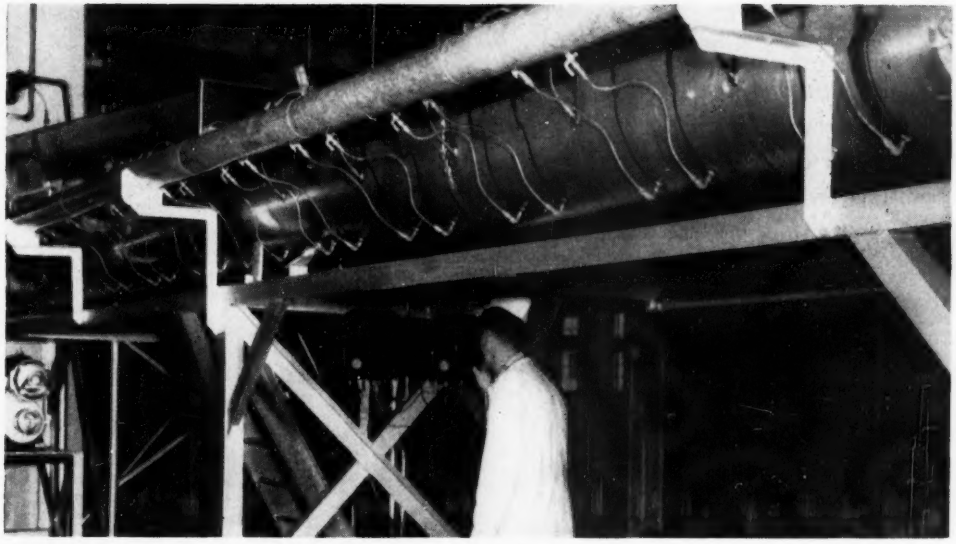
FE STAFF

A notable increase in production, improvement of product quality, and a decrease in general maintenance time—all these benefits were gained by Beech-Nut Packing Co. engineers when they adapted the Reitz Thermascrew to their specific process.

This unit, operating in the company's San Jose, Calif., plant, now has the required accurate temperature and moisture controls. It blanches 19½ tons of apricots an hour.

The first unit purchased from the Reitz Mfg. Co., Santa Rosa, Calif., in 1948, was a Model TL Thermascrew Blancher, 2 ft. in diameter and 30 ft. in length. Designed for live steam and hot water blanching of fruits and vegetables, it is adaptable for processing many foods.

←THROUGH 30-ft.-long by 2-ft.-dia. shell, hollow helical screw moves product as it is blanched. In operation, the covers are bolted down. Bars between flights of the screw (arrow) are for additional mixing action.



OPERATOR inspects Taylor instruments which automatically control the screw and shell temperatures. The ⅛-in. steam injection jets are operated manually in order to facilitate condensate control.

It is a continuous-type trough blancher of all stainless steel construction with a helical screw operating at from 3 to 9 rpm. and powered by a 5-hp. motor.

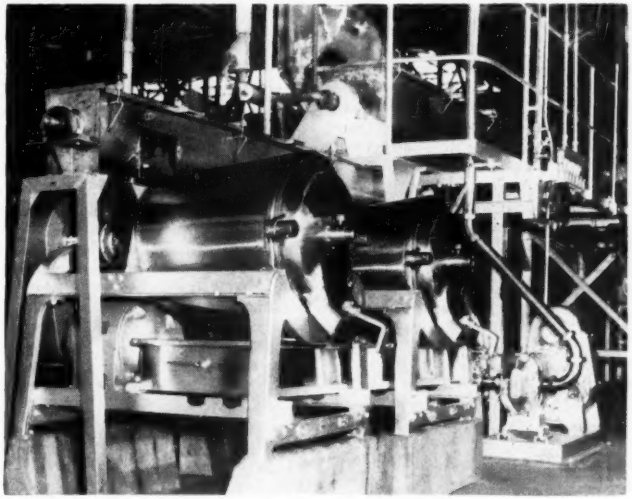
This plant produces only fruit and vegetable baby foods. And, in the processing of these products, an important factor is the amount of condensate which may form in the shell during operation. Since the screw was not specifically designed for use in such a process, it was necessary for company engineers to make several changes in it to control this source of moisture.

Mechanics of It

First, the hollow flight of another Thermascrew was remodeled. The holes in the central shaft of this screw, through which steam entered the shell, were plugged. Steam still circulates through this hollow central shaft to maintain proper product temperature, but it does not escape into the shell.

The number of ⅛-in. steam-injection jets in the shell was increased to 52. And the operation of these jets was changed from automatic to manual, so that the operator can now accurately control the amount of condensate accumulating in the shell by turning on or off as many jets as necessary.

Jets are supplied with steam at 125 psi., providing a quick blanch advantageous in baby food processing. The temperature of the hollow flight and that in the shell is automatically controlled by use of Taylor instruments.



AT EXIT END of unit is collector screw (top left) that conveys the product into two Langsenkamp pulpers (seen in foreground).

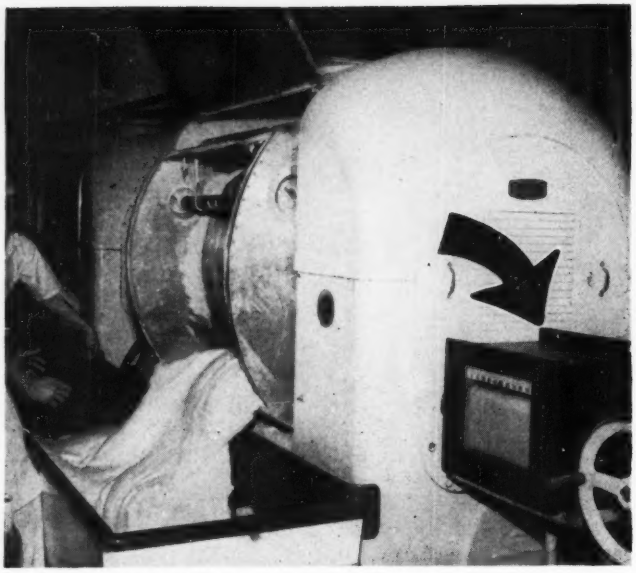
Another change made in the unit to accommodate the processing of these baby foods was the installation of a weir at the exit end. This acts as a dam, keeping the product at the proper level in the shell in relation to unit temperature to eliminate scorching. It can be adjusted to control the level of products of varying viscosities. From the weir the product drops into a collector screw and then goes to two Langsenkamp pulpers.

For reasons of sanitation, a steam duct extension was added to the original unit. Steam emitted by the screw was causing formation of what was considered to be an undesirable amount of condensate on the ceiling of the building. The duct is connected to the original exhaust and extends through the ceiling.

Meter Takes

Graphic indication and recording of energy input to dough mixer can be used to quantitatively regulate baking formulas to compensate for changes in flour composition. And technique is rapid

JIM PRICE
and
ROY EVANS
Minneapolis-Honeywell Regulator Co., Philadelphia



POWER INDICATOR (arrow) is mounted at dough mixer for continuous gage of rate of energy input to mixer motor during complete series of operations. Seen here is breaking of dough from mixer arms.

A novel adaptation of a special measuring instrument – ingeniously borrowed from the electrical power tester's kit–is helping to make more uniform products at Fishel's Bakery in York, Pa.

Using the device, the operator of the dough mixing machine now makes immediate changes in formula or mixing time when it is necessary to compensate for variations in flour characteristics.

Thus, former delays entailed by laboratory testing of new batches of flour and subsequent computing of formula corrections are today virtually eliminated.

An averaging-type electrical power indicator, the unit is being employed to measure work input to the dough mixer via its motor. And since mixer-power is a function of dough consistency, rapid calculations can now be made to figure the periods for overmixing and flour holding-time.

Heart of Operation

A number of baking industry experts have long since concluded that the key to making the best possible dough from a given flour lies in measuring dough consistency—as a function of water absorption and gluten development—*during mixing*.

The instrument to do this job should make this measurement with a high degree of accuracy under typical plant conditions. It must also be rugged enough to operate in the dough mixing room of a bakery, and simple enough for use by relatively untrained personnel.

In addition, the graph of dough consistency drawn by the instrument must be sufficiently clear for an attendant to interpret it without requiring special training.

The instrument employed at Fishel's actually gages the amount of electric power being consumed by the mixer–in short the amount of work the motor is called on to perform.

Actually, mixer motor load depends on the design and construction of the mixer, the quantity of dough being mixed, and the viscosity of the dough. But since the quantity is constant and the design factors do not vary, motor load is considered to be directly related to dough consistency.

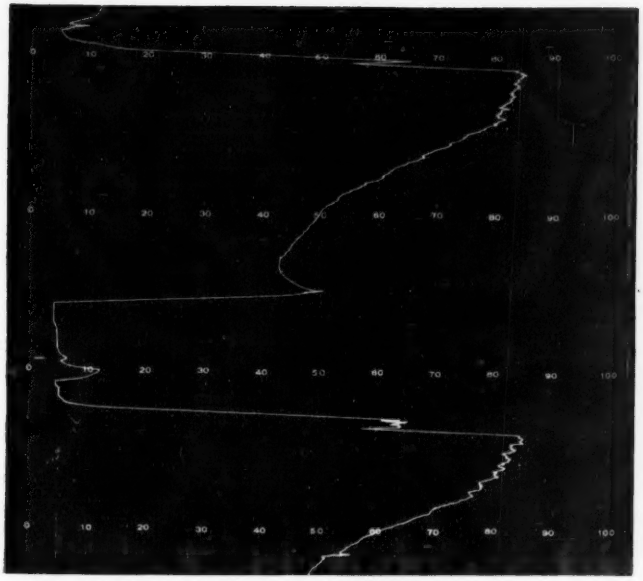
What Really Happens

Initial experiments showed that motor load fluctuates widely as the dough is mixed, spun by the rotors, broken across the breaker arm, and drops to the bottom of the bowl. To measure average load conditions over a short period of time instead of instantaneous fluctuations in power requirements, the installed system first changes electricity into heat, and then heat back into electricity.

The common principles involved are those of the resistance-type electric heating element, which changes electrical energy into heat, and the thermocouple, which reverses the process. Purpose of this double-change is to introduce an averaging effect into the measuring system and to compensate for voltage fluctuations and other factors that destroy the accuracy and legibility of records when current consumption is gaged directly by an ammeter.

A Weston Thermoverter, connected through transformers to the mixing power supply lines, converts a small amount of the current supply into heat. Both series and parallel connections are made, so that the system measures both the voltage and the amperage of the power supply.

The Thermoverter also includes a



TYPICAL CHART from indicator shows similarity of power curves in successive mixer cycles. Peaks (right) indicate points of highest dough consistency. Rate of climb shows correctness of formula.

Mixer's Pulse

thermocouple, mounted to gage output of the heating elements. This couple produces a minute voltage proportional to the heat generated—thus providing a direct measure of work done by the mixer.

Output of the Thermoverter is continuously measured and recorded by a Brown ElectroniK potentiometer on a fast-moving strip chart. The latter is evenly divided and graduated from 0 to 100, and it travels at a speed of about 15 in. hourly, so that approximately 4 in. of chart shows a single complete mix record.

Piloting the Indicator

An experimental instrument, built especially for this application, was installed on a Read mixer at Fishel's in October 1951. This was used during normal mixing operations as well as during the running of experimental mixes.

Results showed that it was possible to obtain an accurate graph of dough viscosity, and that the maximum value of the dough viscosity curve was identical for identical-mix batches. In addition, it showed that any variations in normal operating procedures could be detected by consulting the chart record.

In using the consistency meter, attention is paid to the shape and direction—rather than numerical value—of the mixer curve in order to mix the dough to the point of maximum viscosity before emptying the mixer. However, this maximum point on the arbitrary 0-to-100 scale is the same for all batches of dough mixed from the same ingredients under the same conditions.

On an initial batch, it is usually necessary to overmix the dough slightly to make sure the maximum value has been reached. This overmixing is usually compensated by a slightly lengthened floor holding time for the first trough. On subsequent batches, the machine is stopped as soon as the same peak value is reached, unless the schedule calls for a period of overmixing.

Custom Tailored Goods

Some regional markets demand bread that has a relatively coarse, open texture. This is best produced by mixing the dough to maximum consistency. However, the general trend toward a finer-textured bread has caused many bakers to adopt a program of overmixing plus long floor time to create the desired cell structure.

In both cases, it is important that the baker know exactly when each mix reaches the point of maximum viscosity. This is especially critical where overmixing is employed, so that the proper floor-time schedule can be determined.

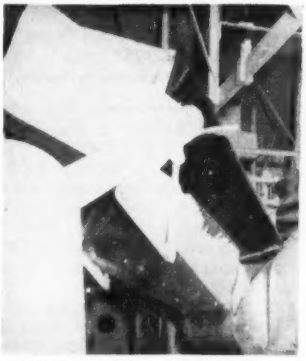
The meter not only helps the baker to revise his formulas and mixing times whenever he changes the flour he is using, but also serves to give other

(*Turn to page 215*)

Engineered Loading—Sparked by the Charts

"Striking value of the graphic records provided in the new instrumentation—indicating mix-room efficiency by showing number of mixes and the time of all operational phases—was recently demonstrated when charts from Fishel's instrument were seen by a baker from another company.

"He was astonished at the amazingly short time shown to have elapsed between mixes. And on looking into the matter he found that the chief difference, in comparison with his own operation, was that Fishel's used a trough hoist instead of cutting the dough and loading the mixer by hand. "Seeing this outright evidence of the dollars-and-cents value of a hoist, this baker was able to convince executives at his own plant that the purchase price of a trough hoist would be amply justified by increased output and labor savings."—*J.P. & R.E.*



FISHEL'S TROUGH HOIST in action. The instrument records testify to the efficiency of such equipment.

MECHANICALLY GRADED for size, eggs are delivered to candler by grader conveyor (bottom). Candler easily reaches cartons and counting dials. Flat separators (above) are for undergrade eggs.

Breaks Egg-Grading Bottleneck

New machine with "soft touch" weighs eggs, classifies them into four sizes, and conveys them to candlers. Counting device also speeds operation

C. R. HAVIGHORST
Associate Editor, Food Engineering, San Francisco

As long as five years ago, consumer demand for Safeway Stores' high-quality eggs was fast exceeding the production ability of Brentwood Egg Co. (Safeway's egg supply unit), even 'round-the-clock operation not meeting the demand.

Analysis revealed a production bottleneck which stemmed largely from the now obsolete methods used in size-grading, counting, and cartoning eggs.

It was then a tedious and tiresome manual operation for candlers. They wrestled heavy egg crates, served themselves by reaching into the crates, and tabulated their candling production in longhand with a pencil. Result: Both physical and mental fatigue on the job.

And not only was production volume unsatisfactory, but the fatigue caused an increasing number of grading errors as the work-day progressed. Since any carton containing even one improperly graded egg was removed from the conveyor to have its contents regraded, some candlers' work doubled and production slowed.

The shell of an egg is the most fragile of all food packages. And its ellipsoid shape poses problems of mechanical handling in a continuous type of flow. Eggs cannot be handled roughly in bulk. Further they can be rolled by gravity only short distances without danger of breakage—and then only when their greatest axis is in a horizontal plane.

Devised by R. C. Sneed and with the prototype built by Safeway engineers, the Sneed FMC Egg Sizer & Tabulator machines have eliminated all the most serious manual bottlenecks—except the necessary hand candling.

Doubles Plant Output

Food Machinery & Chemical Corp., which now manufactures this equipment, has installed nearly 200 of the units in the past two years. At the Brentwood Egg Co.'s Emeryville, Calif., plant, 20 of them are arranged in line, in two sections of 10. In the center of the two sections are the two egg-casing stations.

This mechanization of egg handling, weight-grading, and automatic counting has doubled plant production. And on a man-hour basis, it has made possible a 100 percent higher production by candlers.

At this plant, candlers now are specialists. They have only to candle

eggs, place them in the correct carton by quality and weight grade, dial the number of eggs in unfilled cartons, and automatically print (with the FMC Counter) the number of eggs in each lot on an egg-grading ticket.

They no longer have to handle heavy egg crates, remove the fillers, then reach into the crate with both hands for four eggs which must be size-graded and counted as well as candled. The important element of candle-fatigue has been greatly reduced. In fact, candling has been made so easy that there is little or no reason for operator carelessness.

Candlers work in semi-darkness in booths, which are models of mechanical and manual efficiency. Lacking any distractions from their work, the candlers develop a high degree of concentration—an imperative factor if grading errors are to be eliminated. With a continuously replenished egg supply and all other elements required in their work close at hand, they develop smooth, rhythmic motions which greatly reduce muscular fatigue. Relieved of extra duties, they candle double or more the quantity handled by the old method.

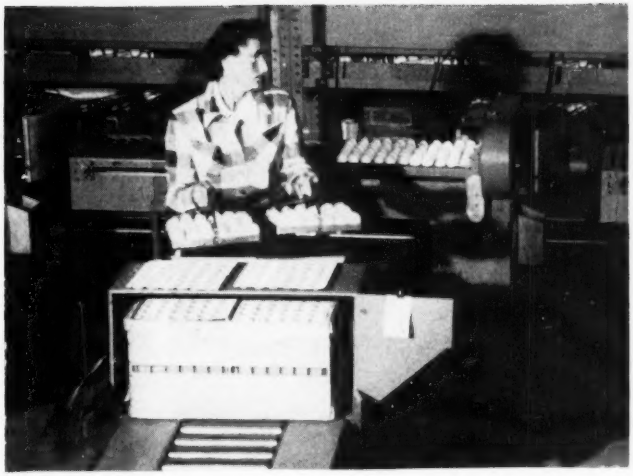
How System Operates

The sizing machine weighs and segregates eggs into four weight classifications—large, medium, small, and pewee. It provides the means for a combination of automatic and manual counting. And the counter delivers printed record-tickets in one, two, or three copies. These show individual grade and quality counts and the total count of each producer's lot.

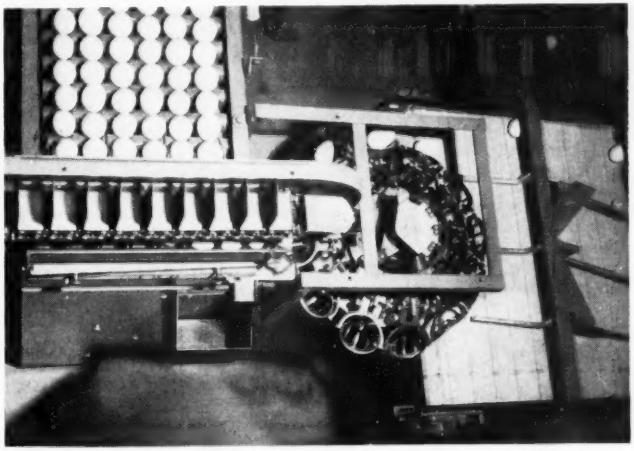
One fork-truck operator keeps all 20 of the gravity conveyors filled with cases of eggs from which each service operator supplies five units. Using transfer-trays, this operator moves 72 eggs at a time to the intake conveyor. This conveyor is covered with white Neoprene, facilitating sanitation and avoiding damage to the eggs. It delivers six eggs at a time to a transverse paddle-type conveyor.

At the transfer point, there are both small and large separator bars, which position properly any egg that might be lying in the spool conveyor at an angle unacceptable to the transfer conveyor. Eggs are placed in the intake conveyor with their greatest axes perpendicular. At the transfer point, they are rolled gently into a rubber-covered wire trough through which the transfer-conveyor moves.

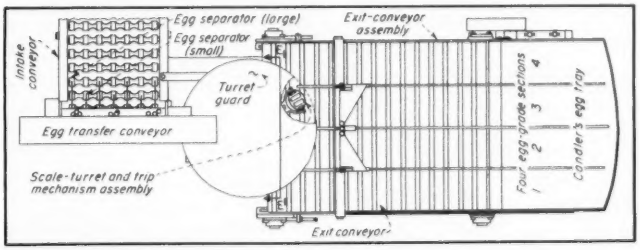
In making this transfer, the eggs move in a 90-deg. arc and lie in the wire trough with their greatest axes horizontal. Then the paddle-type conveyor rolls them one by one into weighing baskets. Any broken eggs



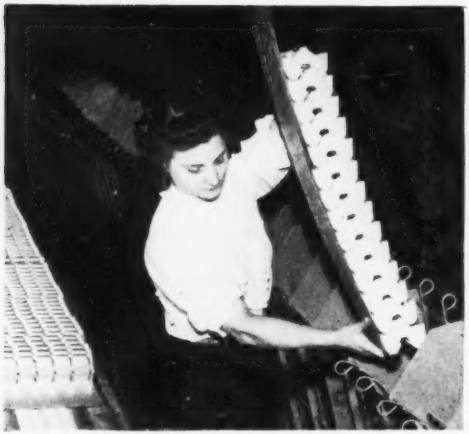
GRADER LOADING is done by girl who receives cases of eggs on gravity conveyor. Lifting a tray with each hand, she transfers two flats (72 eggs) to intake conveyor of grader.



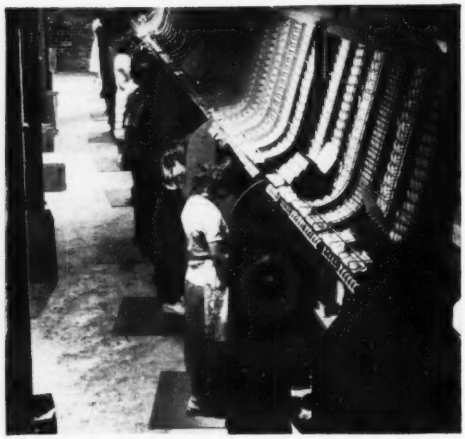
GRADER MECHANISMS are revealed with guards removed. Eggs from intake conveyor (left) roll into paddle-type conveyor and are gently transferred into scale baskets. Scale tripper is on central shaft.



GRADER BLUEPRINT shows plan view of working parts. Intake conveyor has spool-shaped rubber-covered rolls that hold six eggs in each row of interstices. Eggs roll from end of it into transfer conveyor, which takes them to scale baskets. They then go onto exit conveyor and to candlers.



CARTONS for candlers are taken from belt conveyor and inserted into chutes which serve candlers.



CANDLERS work in ten booths, in semi-darkness. Illumination from flash bulbs shows carton chutes.

are caught in a tray at this transfer point.

Both intake and transfer conveyor are operated by ratchet drive. Their movements are synchronized on a one-to-six ratio. The intake conveyor moves once to deliver six eggs, while the transfer conveyor moves six times to feed the scale unit. The scale turret moves continuously and positions a weighing basket at the exit of the transfer conveyor to receive each egg.

The weighing mechanism can be adjusted to a tolerance of from $\frac{1}{2}$ oz. to $\frac{1}{4}$ oz. for each of the four weights desired. Each basket has a balance-beam, point and stem, equipped with adjustable microweights. Attached to the beam is a scale dash-pot, or hydraulic stabilizer. When an egg rolls into a basket, the basket will assume a balance and will position the beam point so that it will follow one of the four knife-edge tripping mechanisms. These automatically trip baskets, rolling the eggs out into the proper one of the four grade sections of the exit conveyor which feeds the candler's tray.

Each section holds ample reserve in order to keep delivery ahead of candling. And if some lots of eggs run heavily to any one size, the candler may adjust the sections to accommodate this heavier flow.

The speed of feeding and weighing mechanisms can be adjusted to the candlers. Capacity of the machine is limited by candler's ability to grade the eggs. It will deliver up to 80 cases of eggs in an 8-hr. day.

Candlers select eggs from the four grade sections and candle them by the usual conventional candling lights.

SCORE OF GRADERS, half of which are shown here, comprise the high-capacity in-line installation. Service operators transfer eggs from cases (right) to grader intake conveyors.

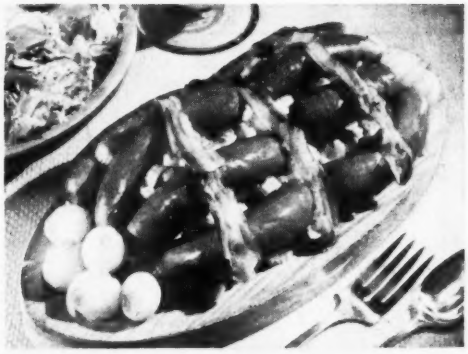
Efficient Packaging

Directly in front of, and a little above, each candler are the exits of the eight carton chutes. Although the eggs are weighed in only four grades, they are blended into eight grades. Each of the eight cartons is of a different color to designate grades. Cartons are made by a carton-maker machine at a central point. They are delivered by conveyor along the catwalk to carton suppliers (one to each of the two sections) who keep the chutes full.

Cartons are used only for the paying grades; undergrades are packed into flats of 36. The V-shaped bottoms of cartons are placed over an open actuating switch. When a carton is filled, the candler pushes it forward onto a conveyor, closing the switch. This automatically registers 1 doz. of the proper grade and quality of eggs on the counter. Flats of 36, when filled, are pushed onto a conveyor, and this amount and kind also is automatically registered by the counter. Cartoned eggs and eggs in flats move on separate conveyors to the egg-casing stations.

As producer's lots seldom come out in even dozens, the candler registers the fraction of 12 or 36 count at the end of each lot on hand-operated dials. Cartoned eggs are registered on a telephone-type dial, and undergrades on

(*Turn to page 170*)



Packers Weigh Trends, Problems

See big future as population increases and demand for prepackaged and processed meats zooms. But there are question marks on horizon

JOHN CUTTING
Department of Public Relations,
American Meat Institute, Chicago.

Every night the United States sits down to dinner, 7,000 more people reach for the meat platter. This is like adding a city about the size of Providence, R. I., every month, or a state about as large as Indiana each year.

This is one of the basic trends being weighed by meat packers. And other not so rosy trends and problems face this big segment of the food industry – a segment whose wholesale sales for 1951 were 11½ billion dollars, but whose profits average less than ½c. per pound of meat.

Packers are particularly interested in the population trends, which in large measure delineate their future market. They note the U. S. Chamber of Commerce prediction of a population exceeding 175 million in 1960, and the Bureau of Census forecast of 180 million.

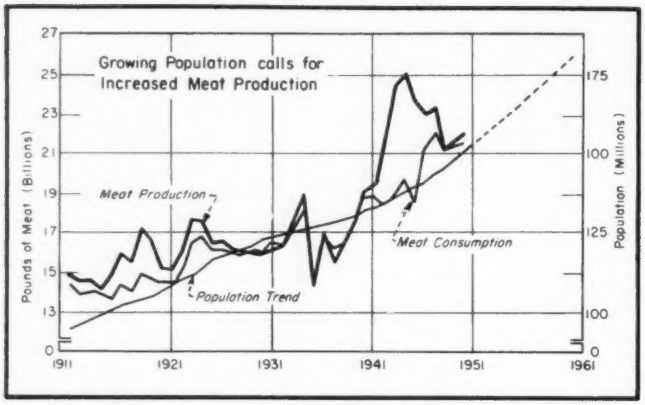
This trend points to a need for 26.5 billion pounds of meat in 1960 at present per capita consumption of about 140 lb. per person. To reach the goal of 175 lb. per capita in 1962, nearly 32 billion pounds would be required.

Cattle numbers have increased by 11 million head, or 15 percent, in the past three years. And there is reason

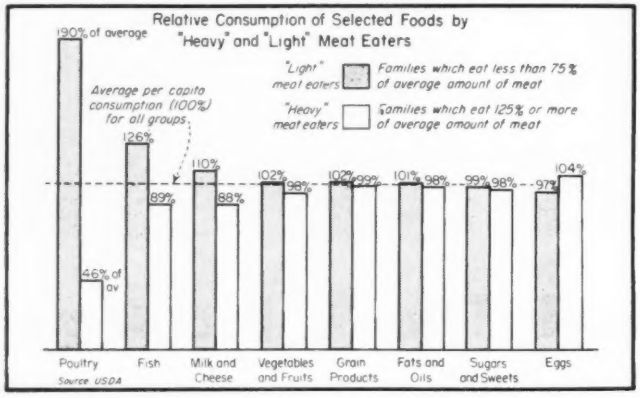
TABLE—POPULARITY RATINGS of Different Types of Sausage (Survey of 750 Housewives)

Sausage	Serve Frequently (Percent)	Serve Occasionally (Percent)	Serve Seldom (Percent)
Wieners	53	38	9
Frankfurters	46.6	42.2	11.2
Bologna	35.8	39.3	24.9
Liver sausage	35.4	45.3	19.3
Pork links	34.0	54.2	11.8
Ham sausage	23.4	38.9	37.7
Leona sausage	23.2	34.7	42.1
Smoked mettwurst	14.1	46.1	39.8
Bratwurst	13.9	35.8	51.3
Fresh mettwurst	14.1	41.1	39.8
All types	35.8	42.5	21.7

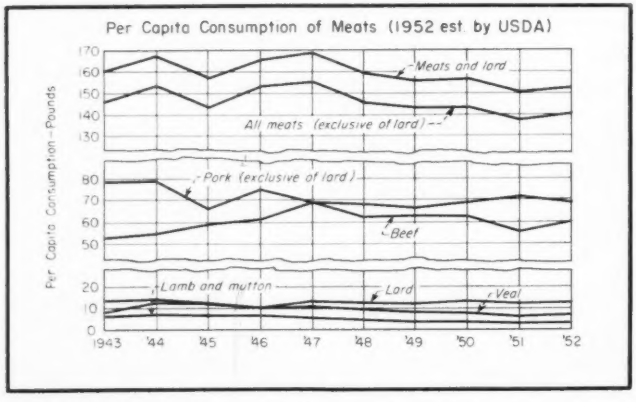
These Charts Tell Three Trend Stories



OPPORTUNITY for greatly increased meat production is presented by population forecast for 1961.



CHALLENGE to meat packers is seen in competition from poultry, fish, and dairy products for consumer's dollar.



PERFORMANCE of meat products in terms of per capita consumption, or space in consumer's stomach.

to believe that we can increase meat production to keep pace with population growth for at least another half century. Aside from meeting the demand for meat, we must have enough livestock to convert surpluses of grain and other foods into animal food products—and such byproducts as leather, insulin, tankage, and fertilizer.

$64 Questions

Now if farmers raise 20 percent more livestock, these questions arise: Will the present number of packers increase operations, or will new companies enter the field? Will the present trend of segregating retail meat sales into fewer and larger outlets continue? Will meat retailers turn more and more to pre-packaged and self-service meats? Will meat locker plants increase, and will this idea extend to home freezers?

Prepackaging Zooms

In the past five years, the number of self-service meat stores has grown from 178 to 5,363. Most new chain stores have 100 percent self-service meats, and policies for the future point that way. There are about 10,000 stores on a semi-self-service basis. And self-service meats this year will account for about $1½-billion in sales.

The Best Sellers

Packers, of course, are keenly interested in the relative popularity of different prepackaged meats. Here the most recent study, made by a Milwaukee newspaper, is revealing. Nearly 90 percent of the 5,000 families covered purchased prepackaged bacon, and 23 percent bought canned corned beef hash. Chili con carne was purchased by 18 percent, frankfurters by 92 percent, pork sausage by 82 percent, and liver sausage by 89 percent. Canned baby meat was not much in demand, only 8 percent buying it.

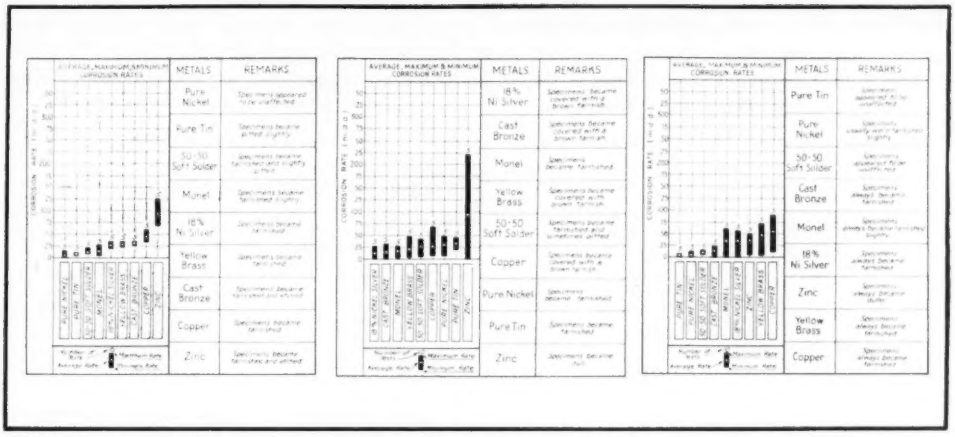
Canned Meat Boom

One of the outstanding trends is the increased production of sausage and canned meats.

Federally inspected canned meats production in 1951 totaled 1,441,200,000 lb. And all but 2 percent was consumed by civilians. Canned meat production increased 400,000,000 lb. in the past two years, 500 percent in the last 15 years.

Canned meats comprise about 12 percent of all Federally inspected meat. Of this, luncheon meat—350,000,000 lb. a year—accounts for about 23 percent of the output. Other

(*Turn to page 184*)



GRAPHS show results of corrosion tests made on metals in various stages of pea processing. Left: Gravity separator, 40 to 45 deg. brine. Center: Blancher. Right: Filler hopper. Nine different metals were used in tests.

Technical Facts for Food Processors on

Nickel and High-Nickel Alloys

PART II—Metal Data on Brines, Juices, Dressings, Cereals, Vegetables

REFRIGERATING BRINES are used to a considerable extent in the food processing industry, and generally they consist of concentrated solutions of sodium chloride, calcium chloride or mixtures of calcium and magnesium chlorides.

Each has a concentration range where the corrosive effect is least and efforts are made to control this factor. Where this is not practical, inhibitors are added to the brines to minimize corrosion.

Under such conditions steel and cast iron are generally satisfactory, but in some instances protection must also be provided against contamination of the foodstuff being cooled or refrigerated. It is evident, therefore, that better metals and alloys are oftentimes required and the data in Tables VI and VII (for earlier Tables see Part I, FE Aug.) indicate the relative corrosion resistant behavior of various materials in brine service.

Pickling Brines

Generally, the pickling brines are made up with small amounts of organic acids, such as acetic or lactic, plus salt and/or sugar. Table VIII gives the results of six plant corrosion tests in pickling brines for herring, olives, cucumbers, onions, sauerkraut, and sausage. No significant amount of corrosion occurred on the majority of the materials tested.

Copper, tin, and mild steel exhibited significantly higher corrosion rates —with particular reference to Test 4 (see table)—than the other materials studied. Monel, nickel, and Inconel have all proved by practical application to be well suited for handling these various brines, and they are usually preferred for equipment used in this service.

Fruit Juices and Syrups

Table IX gives the results of a number of plant and laboratory corrosion tests on Monel, nickel, Inconel and 18-8 stainless steel in a variety of fruit juices and syrups under different conditions of exposure.

Generally, it will be noted that the materials tested performed satisfac-

EDITOR'S NOTE: Highlight sections, charts, and tables of a comprehensive forthcoming bulletin, *Corrosion Resistance of Nickel and High-Nickel Alloys in Food Processing*, have been collated by FE into a special two-part article, of which this is Part II.

Covered here are results of corrosion tests on metals in contact with refrigeration and pickling brines. There is also detailed information for canners of citrus fruits, peas, corn, and for processors of salad dressings and breakfast cereals.

Part I (FE Aug., p. 79) considered general compositions and characteristics of the metals and their heat transfer rates. It also covered information for tomato canners.

The special bulletin has been prepared by the Development & Research Div. of the International Nickel Co., Inc., which has granted FE exclusive permission to publish this material in advance.

TABLE VI—Laboratory Corrosion Tests in Sodium Chloride Refrigerating Brine

TEST 1—In saturated sodium chloride refrigerating brine (pH 8.5) at 18 deg. F. for 90 days.
TEST 2—In spray from above refrigerating brine at 18 deg. F. for 90 days.

Material	Indicated Corrosion Rate (In. Penetration Per Yr.) Test 1	Test 2
Monel	0.0001	0.0002
Nickel	0.0001	0.0003
Inconel	0.0001	0.0002
Copper	0.011	0.0033
Zinc	0.026[1]	0.013[1]
Mild Steel	0.0087[2]	0.010[2]
Ni-Resist	0.0030	0.0035
Cast Iron	0.010	0.013

[1] Specimens of this material, originally 0.031 in. thick, were perforated during test period.
[2] Pitted to a max. depth of 0.006 in. during test.

TABLE VII—Plant Corrosion Tests in Calcium Chloride Cooling Brine With and Without Inhibitor

TEST 1—In 30% calcium chloride cooling brine at 10 deg. F. for 355 days.
TEST 2—In 30% calcium chloride cooling brine with potassium dichromate added as inhibitor at 10 deg. F. for 372 days.

Material	Indicated Corrosion Rate (In. Penetration Per Yr.) Test 1	Test 2
Monel	0.0003	<0.0001
Nickel	0.0001	<0.0001
Inconel	<0.0001	<0.0001
Copper	0.0004	0.0002
Tin	0.0007[1]	0.0001[2]
Ni-Resist	0.0012	0.0001
Cast Iron	0.0068	0.0004

[1] Specimens, originally 0.031 in. thick, were perforated during test.
[2] Pitted to a max. depth of 0.017 in. during test.

TABLE VIII—Plant Corrosion Tests in Pickling, Canning Brines

TEST 1—In tank containing herring and pickling brine consisting of 12% sucrose, 2% acetic acid, plus small amount of salt from herring and balance water. Temperature 40 deg. F. to atmospheric. Duration of test 116 days. No aeration or agitation.
TEST 2—In olive brine tank containing sodium chloride and small amount of lactic acid. Temperature cold. Duration of test 220 days. No aeration or agitation.
TEST 3—In cucumber pickle preheater containing cider and grain vinegar plus sugar. Temperature 140 deg. F. Duration of test 85 days. No aeration or agitation.
TEST 4—In kettle used in preparation of onion pickling brine consisting of 3% sodium chloride, 2% acetic acid, and 35% sugar. Temperature boiling. Duration of test 2 hr. No aeration but agitation due to ebullition.
TEST 5—In vessel containing sausage casing brine consisting of sodium chloride plus sulfate and sulfur compounds. Temperature atmospheric. Duration of test 4 days. No aeration or agitation.
TEST 6—In sauerkraut brine containing vinegar and sodium chloride. Temperature atmospheric. Duration of test 120 days. No aeration or agitation.

Material	Indicated Corrosion Rate (In. Penetration Per Yr.) Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Monel	0.0001	0.0019	.....	0.0008	0.0008	0.0001
Nickel	0.0001	0.0023	0.0035	0.0031	0.0007	0.0005
Inconel	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001[1]
18-8SS (Type 302)	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
18-8SS (Type 304)	<0.0001	<0.0001	<0.0001	<0.0001	.....	.....
18-8 Mo SS (Type 316)	<0.0001	.....	.....	.....	.....	.....
Copper	.....	0.0033	.....	0.015	.....	.....
Tin	.....	.....	.....	0.030	.....	.....
Mild Steel	0.0004	.....	.....	0.11	.....	.....

[1] Local attack in the form of pitting to a max. depth of 0.008 in.

torily, and this is borne out in practice, since they are used rather widely for equipment in the processing, storage and dispensing of fruit products. However, in some applications where the corrosive conditions are especially severe due to a combination of high temperature and strong aeration, Inconel and 18-8 stainless steel prove to be the better materials.

Furthermore, when requirements are such that virtually complete freedom from tarnishing of equipment is desirable, Inconel and 18-8 stainless steel are preferred. Generally, tarnishing neither injures the product nor materially decreases the life of the metal, but it may be objectionable on the basis of appearance when the fabricated apparatus is installed where it may be viewed by the public.

In spite of occasionally higher rates of corrosion and susceptibility to tarnishing, pure nickel is more widely used than any of the other materials for the heating surfaces of steam jacketed cooking kettles where economic advantage is derived from its high rate of heat transfer.

Mayonnaise, Salad Dressing

From the data presented in Test 1 and 2 in Table X, it will be seen that Inconel is a most suitable material for whips and beater bowls in contact with mayonnaise at atmospheric temperature, because it is immune to significant attack and, as found from careful examination, it is also free from tarnish.

Nickel and Monel are less suitable chiefly because of their tendency to tarnish, which may or may not be considered a serious objection.

The manufacture of cooked salad dressing requires the use of materials for the cooking kettles that can withstand the effects of prolonged contact with boiling solutions of vinegar and salt, and it is evident from Test 3 of the table that such mixtures are very corrosive.

None of the materials tested showed up satisfactorily, since Monel, nickel and Inconel exhibit rather high rates of corrosion and the 18-8 stainless steels, while they possess low rates of attack, as measured by weight loss, were subject to rather severe local attack. Inconel was formerly used for this service but gave uneconomical performance because of a tendency toward pitting attack.

Experience has demonstrated that 18-8 molybdenum stainless steel (Type 316) represents the best choice of material for handling such mixtures. However, this stainless steel also shows some tendency toward localized corrosion in the form of pitting. But this can be kept to a minimum by having the surface of the steel as highly polished as possible and by cleaning the surfaces to remove any salty solids after each use.

Breakfast Cereals

In the preparation of breakfast cereals primarily from corn and wheat,

TABLE IX—Plant and Laboratory Corrosion Tests in Fruit Juices and Syrups

Material	Condition	Indicated Corrosion Rate (In. Penetration Per Yr.) Inconel	Nickel	Monel	18-8 SS (Type 304)
Tomato juice	Aerated, room temp.	0.0000	0.012	0.003	.....
Tomato juice	Unaerated, room temp.	0.0000	0.003	0.0001	.....
Tomato juice	Fully aerated, 170° F.[1]	0.0002	0.044	0.015	0.0003
Tomato juice	Fully aerated, 195° F.[1]	0.0002	0.016	0.008	0.0002
Lemon juice	Aerated, room temp.	0.0003	0.020	0.010	.....
Lemon juice	Boiling under reflux	.....	0.014	0.0006	.....
Lemon juice	Unaerated, room temp.	0.0003	0.0005	0.0005	.....
Lemon syrup	Fully aerated, room temp.	0.0000	0.001	.....	0.0000
Lemon syrup, Diluted	Fully aerated, room temp.	0.0002	0.034	.....	0.0004
Lime syrup, acidified into citric acid	Unaerated, room temp.	0.0002	0.0001	0.0001	0.0001
Pineapple juice	Aerated, room temp.	0.0000	0.018	0.005	.....
Pineapple juice	Unaerated, room temp.	0.0000	0.004	0.0007	.....
Pineapple juice	Alternate immersion 132° to 178° F.[1]	0.0004	0.010	0.006	0.0001
Pineapple juice	Fully aerated, 180° F.[1]	0.0007	0.036	0.030	0.0002
Pineapple Juice	165° to 175° F., 16 to 18 in. vacuum[1]	<0.0001	0.0045	0.003	0.0003
Grape juice	Aerated, room temp.	0.0000	0.025	0.005	.....
Grape juice	Unaerated, room temp.	0.0000	0.006	0.002	.....
Grape juice	Boiling under reflux[1]	0.0004	0.007	0.0003	0.0001
Orange juice	Boiling under reflux	.....	0.008	0.0007	.....
Orange syrup	Fully aerated, room temp.	0.0000	0.0007	.....	0.0000
Orange syrup, diluted	Fully aerated, room temp.	0.0002	0.025	.....	0.0004
Apple juice	Aerated, room temp.	<0.0001	0.0004	0.0005	.....
Apple juice	Unaerated, room temp.	0.0000	0.0001	0.0001	.....
Apple cider	Unaerated, room temp.[1]	<0.0001	0.001	0.0009	0.0001
Apple cider	Unaerated, boiling	<0.0001	0.002	0.0012	<0.0001
Grapefruit juice	2.7% Citric acid, hot	0.0002	0.0002	0.0001	0.0002
Grapefruit juice	2.7% Citric acid, cold	0.0007	0.0006	0.0005	0.0007
85% Grapefruit juice and 15% orange juice	Aerated, room temp.[1]	<0.0001	0.022	0.002	<0.0001
Caramel color syrups	Unaerated, 212° F.[1]	0.0014	0.0015	0.0011	<0.0001[2]

[1] Indicates field tests.

[2] Specimens pitted to a max. depth of 0.001 in. on surface and 0.011 in. in crevice formed by bakelite and metal surface.

TABLE X—Laboratory and Plant Corrosion Tests in Mayonnaise and Other Salad Dressings

Test 1—In mayonnaise beater bowl containing mixed spices, sugar, salt, eggs, salad oil and vinegar. Temperature atmospheric. Duration of test 5 days. Mixture was both aerated and agitated.

Test 2—In storage of above mayonnaise. Temperature atmospheric. Duration of test 21 days. No aeration or agitation.

Test 3—In boiling solution of 1% by weight acetic acid (as vinegar) and 5% salt used in preparation of salad dressing. Temperature boiling. Duration of test 100 hr. and 20 days. No aeration but agitation due to ebullition.

Test 4—In above salad dressing after cooking. Temperature atmospheric. Duration of test 21 days. No aeration or agitation.

Material	Indicated Corrosion Rate (In. Penetration Per Yr.) Test 1	Test 2	Test 3	Test 4
Monel	0.006	<0.0001	0.029	<0.0001
Nickel	0.017	<0.0001	0.025	<0.0001
Inconel	.....	<0.0001	0.020	<0.0001
18-8 SS (Type 302)	.....	<0.0001	0.002[1]	<0.0001
18-8 SS (Type 304)	0.0003	<0.0001	0.002[1]	<0.0001
17% Cr Steel (Type 430)	0.0003	.....	.....	.....

[1] Local rusting with several deep pits.

TABLE XI—Plant Corrosion Tests in Cooking of Breakfast Cereals

Conditions of Test—In vapor and liquid phases of cooker handling corn and wheat cereal containing flavoring extract consisting of barley, cane sugar and salt. Salinity corresponded to 6.7°-15.3° Bé. or 7%-16% sodium chloride. Duration of test 153 days. Temperature 75°-175° F. (ave. 140° F.) Aeration: Open to atmosphere. Agitation: Provided by Lightning Mixer.

Material	Indicated Corrosion Rate (In. Penetration Per Yr.) In Liquid	In Vapors
Monel	0.0039	0.0007
Nickel	0.0034	0.0005
Inconel	0.0001	0.0001
18-8 SS (Type 302)	0.0001[1]	<0.0001[1]
18-8 Mo SS (Type 316)	<0.0001	<0.0001
Aluminum 28	0.0044[2]	0.002[2]

[1] Pitted to a max. depth of 0.006 in. during test.

[2] Specimens, originally 0.031 in. thick, were perforated during test period.

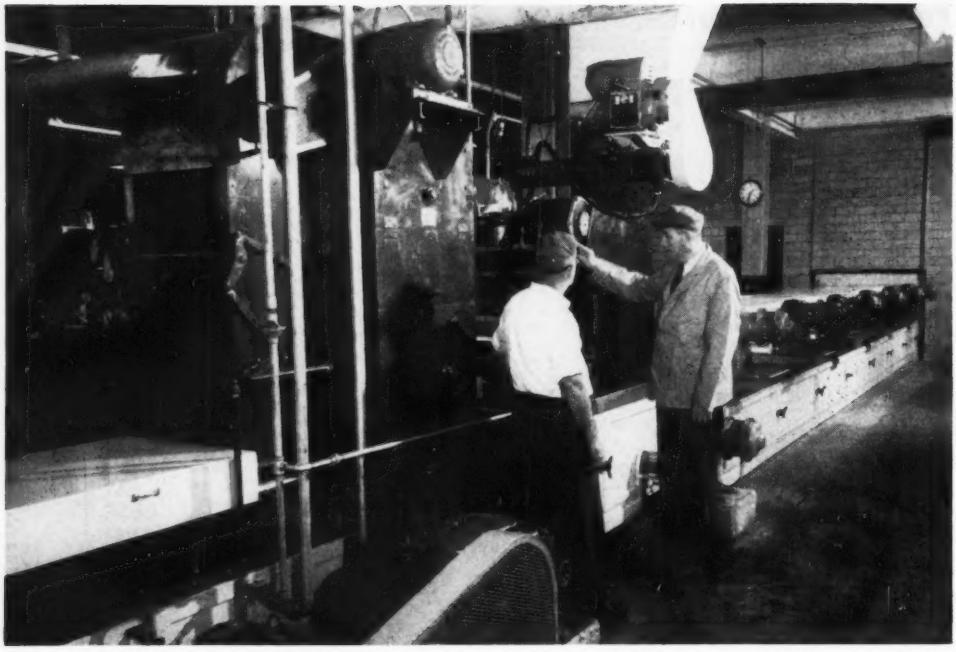
a flavoring agent is added during the cooking cycle. The flavoring agent is generally made from barley with sugar and salt added. The barley is first processed with water at temperatures up to 200 deg. F., then the brew is drawn off and the sugar and salt are added to the mixture. Salt is added in maximum quantics of 60 lb. for each 45 gal. of brew. The resulting solution is maintained at approximately 140 deg. F. until it is added to the cookers.

Results of plant corrosion tests in the liquid and vapor phases of a typically operating cereal cooker are given in Table XI. The data indicate that Monel, nickel and Inconel are all highly resistant to corrosion and would be suitable for this service.

Pea Canning

The process for canning peas as carried out in the plant where these tests were made was presumed to be

(Turn to page 214)



HIGH-SPEED chocolate-bar molding line features special depositor (center) that delivers measured amounts of tempered chocolate into metal molds mounted on chain conveyor traveling through continuous cooler (right).

Nestle's All-Out Engineering

Six changes were targeted by confectioner to simplify operations and up output. Featured are special techniques on continuous lines, with most up-to-date machines and labor-saving materials-handling units

FE STAFF

Mechanized speed in the continuous refining and manufacturing of chocolate products has played a key role at the plant of The Nestle Co., Inc., Fulton, N. Y.

Here, processes have been scientifically arranged to avoid unnecessary handlings. Section for section and room for room, temperatures have been adjusted to the needs of the product to assure year-'round output of more uniform quality chocolate confections.

Constantly alert to the development of more efficient equipment, advanced processing methods, better use of areas, and improved handling practices, company engineers have made the work of employees easier and more productive.

In its streamlining of chocolate refining and processing operations to tomorrow's efficiency, management set up six significent improvements:

A. Using an automatic disintegrator, one man now pulverizes 6,000 lb. of sugar an hour.

B. Continuous roasting and then feeding of beans to crackers and fanners is now accomplished with the aid of highly efficient, rotary roasters and circular, closed-circuit conveyors fitted under the ceiling.

C. A mobile weigh-hopper facilitates the task of scaling different varieties of nibs from storage bins and feeding the blend to grinders.

D. A modern line has been installed for pressing of chocolate liquor and then grinding the cake into cocoa powder for subsequent cooling and packaging.

E. Continuous production of small chocolate morsels has been attained on lines equipped with automatic tempering units, high-capacity depositors, and tunnel-type coolers.

F. Volume production has been achieved on chocolate-bar lines comprising continuous tempering, molding, cooling, and wrapping units.

How each of these efficiency-promoting changes fits into Nestle's chocolate refining and processing operations will now be brought out:

A—High-Capacity Pulverizer

Fully 6,000 lb. per hr. of uniformly, pulverized sugar are now being turned out by a single Reitz disintegrator. Dumped from bags into a hopper, granulated sugar is first bucket-conveyed to a 5,000-lb. capacity feed bin.

From here, the sugar is chuted past a permanent magnet and into a short,

horizontal screw conveyor that feeds it to the continuous disintegrator. Pulverized sugar is then discharged into a hopper, from which it is batch-fed into caster-mounted metal bins that are hauled to the chocolate refining department.

B—Continuous Roasting, Handling

Greater efficiency—in terms of higher productivity with maximum labor-savings—is contributed by continuous Link-Belt cocoa-bean roasters.

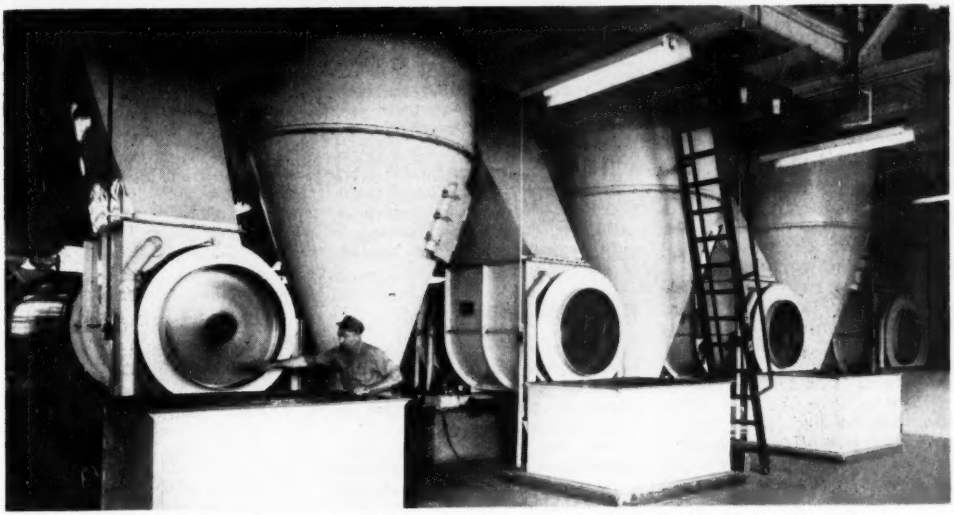
A series of conveyors and elevators delivers cocoa beans to 12,500-lb. supply hoppers on the fourth floor of the refinery. From these hoppers, beans are gravity fed into 2½ ft.-dia. by 55 ft.-long roasters. These units comprise a horizontal drum, through which the beans travel.

Hot gases are introduced through channels formed by a series of radial plates inside the drum. Overlapping tangential louvers permit passage of heat inside, and at the same time prevent beans from falling into the channels. As a result, the beans contact the louvers and not the perforated plates, permitting openings for hot gases.

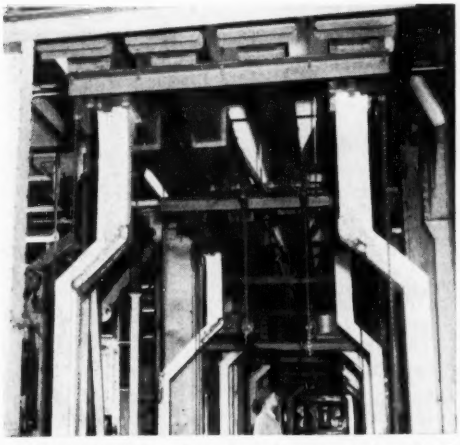
As the gas-fired drums slowly turn, the hot gases pass upward through the circulating bed of cocoa beans to uniformly roast them with minimum breakage. Dust-free discharge from the roasters goes back to the air inlet of the combustion chamber to provide high thermal efficiency. Inlet temperatures in the roasters are thermostatically controlled.

Roasted beans continue through a 6 ft.-long cooling section, where air is drawn through the circulating bed by an exhaust fan and then into a cyclone collector. Cooled, roasted beans are then discharged into metal bins, ready for the crackers and fanners.

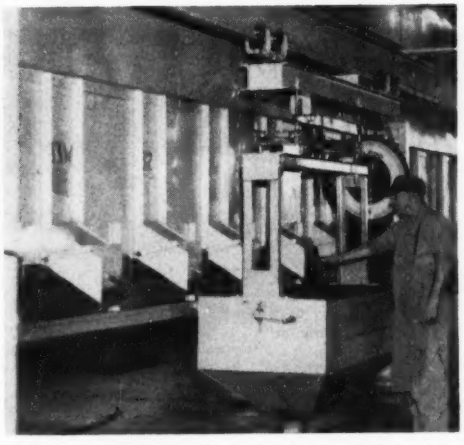
Continuous Product-Handling Units Bring New Efficiencies



IN THESE gas-fired revolving drums, cocoa beans are continuously roasted, cooled, then discharged into bins.

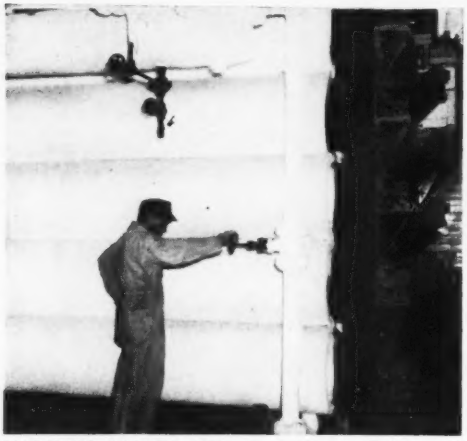


FROM ROASTERS on floor above, beans are automatically fed by conveyors (top) into crackers and fanners.

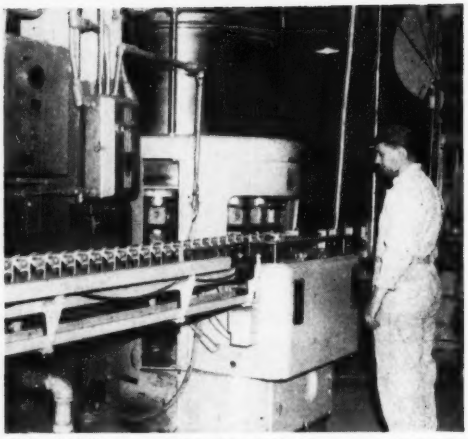


SPECIAL weigh-hopper, mounted on monorail, is used for preparing blends going to grinders on floor below.

Speedy Chocolate-Powder Operations



FIVE-TUBE COOLER chills cocoa powder. Refrigerated unit is equipped with series of screw conveyors.



FAST UNIT vacuum-fills chocolate-milk powder into containers. Line has automatic capper (right).

Mechanized handling of cocoa beans from roasters to crackers and fanners (units that crush the beans and then pneumatically remove shells from "nibs" or broken meats) has abolished the older, costlier manual method.

Employed are run-around, closed-circuit conveyors. These space-saving, horizontal conveyors, mounted directly under the third-floor ceiling, are designed to assure a controlled flow of beans to crackers and fanners.

By chutes from the floor above, these bulk-handling units receive beans from roaster-discharge hoppers, and then convey them around to discharge points, where they are chuted to crackers and fanners directly below. When the crackers and fanners are full, discharge gates are automatically closed. Surplus beans are then recirculated in these enclosed conveyors until needed (and without build-up of back pressure).

C—Simplified Nib Blending

Adoption of a special hopper for batch-weighing various blends of nibs and then gravity feeding them from storage bins to grinders is another significant contribution.

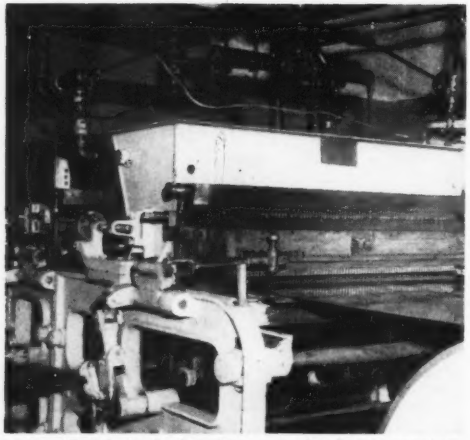
Nibs are bucket-conveyed from crackers and fanners to a horizontal screw conveyor that delivers them into a two-way chute feeding 34 metal bins.

Blending of nibs is carried out according to carefully established formulas. Employed is a large hopper, which is scale-mounted on a circular, overhead monorail below the bins.

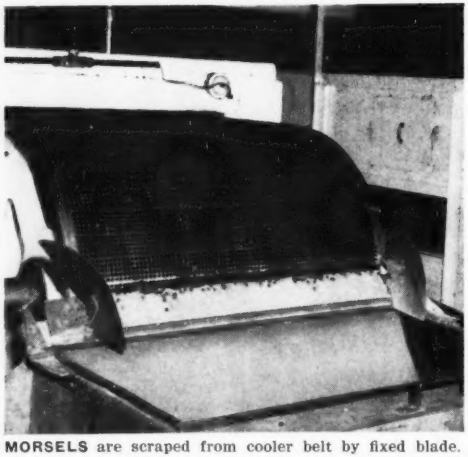
By opening slide gates at the bottom of the bins, nibs are chuted into the mobile cart to form a blend. Next, a gate at the bottom of the cart is opened and the blended nibs fall through an opening and into the grinders. From here, the ground nibs go to refiners, and then the chocolate liquor is gravity-fed into large jacketed storage tanks for further processing.

From these storage tanks, chocolate liquor goes to three different outlets.

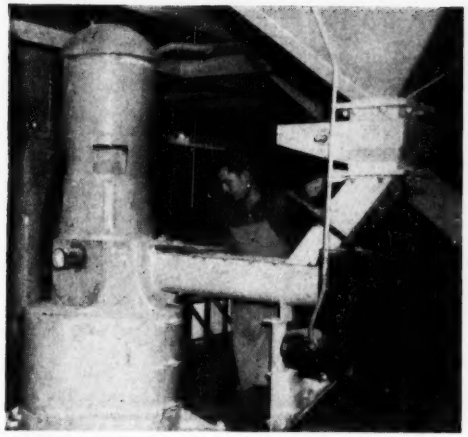
Advanced Chocolate-Morsel Line



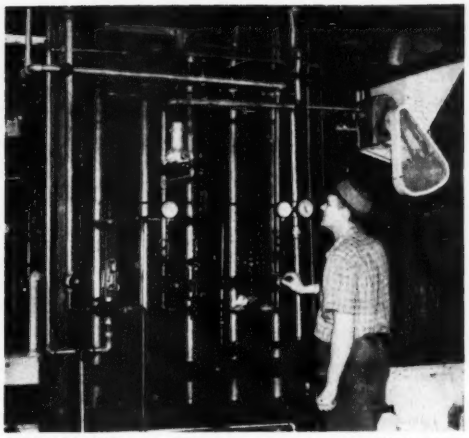
DEPOSITORS feed chocolate onto band-type conveyor.



MORSELS are scraped from cooler belt by fixed blade.



AUTOMATIC disintegrator grinds sugar at 6,000 lb./hr.



FIVE-COLUMN unit tempers chocolate at 5,000 lb./hr.

One serves the tempering and molding departments, where straight chocolate liquor is prepared in final form.

D—Advanced Cocoa-Powder Line

Second outlet is to the cocoa-powder department, where the chocolate is pumped to large hydraulic presses. Here, predetermined amounts of cocoa butter are recovered. Squeezed from the presses, the butter is then filtered and pumped to storage tanks for use in the manufacture of chocolate products.

Cocoa cakes still remaining in the presses are removed and fed to a pulverizer. The ground cocoa powder is cooled and then sifted through fine-mesh screens.

Cooling is carried out by a series of five interconnecting horizontal tubes refrigerated with brine (see photo). Cocoa travels downward from tube to tube by means of screw conveyors inside each unit. Finally, the cocoa powder is bulk-packed in 100 lb.-capacity multi-wall kraft bags by automatic bag-filling and closing machines.

Third outlet from the chocolate liquor storage tanks is to horizontal mixing vats. Here, sugar, cocoa butter, milk, and flavoring agents are added to the liquor to produce chocolate products. At this point, accuracy of the formulation and uniformity of the finished item are rigidly controlled.

The product is fed to five-roll, horizontal refining mills. Refined chocolate then goes to conches.

Now we will detail the new efficiencies in the manufacture of three types of chocolate products—semi-sweet chocolates (morsels for Toll House cookies and other uses), consumer-size chocolate bars, and 10-lb. cakes of chocolate coating.

E—Speedy Morsel Line

Efficient production of uniform quality morsels is now carried out continuously on automatic lines. The operation proceeds as follows:

From mixing tanks, chocolate is pumped into continuous vertical tempering units. Automatic controls maintain the chocolate at the proper temper, ready for depositing.

The tempering unit consists of 8 in.-dia. by 10 ft.-high vertical columns. These columns are jacketed for steam and cold water, and they are internally equipped with twelve staggered scrapers that spread the chocolate over the cooling surface.

Flow is in this manner: Chocolate is pumped through the first column—from bottom to top. It next flows downward through the second column. A second pump then carries the chocolate up the third column.

Tempered chocolate is then directly piped to depositors—two on each line. Each depositor has five rows of pump bars that automatically feed measured amounts of chocolate onto a steel-band conveyor. Operation of two depositors on each line is synchronized so that both feed measured amounts of chocolate on a common conveyor.

Continuous cooling is next. Conveyors (4 ft. wide) carry the chocolates through 150 ft.-long tunnel-type coolers. Ammonia-refrigerated fin coils inside the tunnels keep cooler temperatures at 40 deg. F. A stationary blade at the discharge end of each conveyor scoops off the cooled morsels, which go to packaging machines.

F—Automatic Bar Line

Another Nestle efficiency measure has been the installation of highly engineered equipment for the chocolate-bar lines. Notable are the continuous tempering, depositing, molding, cooling, and packaging facilities.

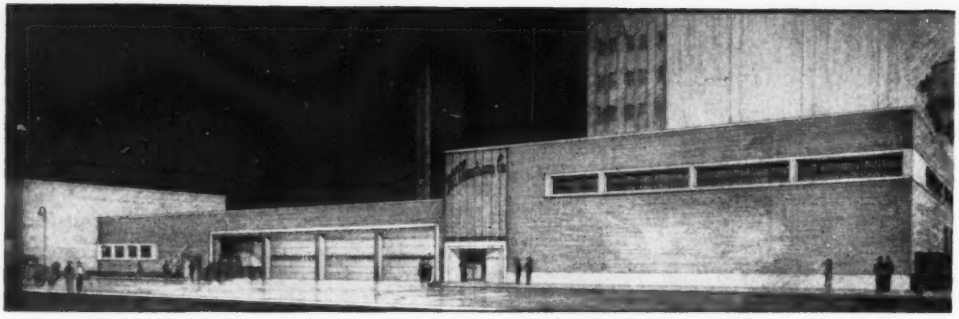
Chocolate bars are produced as follows: From mixing tanks, chocolate is pumped through insulated, electrically heated pipes into water-jacketed tanks located on the third floor of the new finished-goods building. Here, the chocolate is continuously tempered and fed to specially designed automatic depositors.

Each depositor comprises a horizontal piston and rotary valve, so timed that chocolate is drawn from a supply hopper during the suction stroke into the piston cylinder. At the discharge stroke, the valve rotates 90 deg. to permit entry of chocolate to the discharge portion of the pump. Chocolate is then fed to molds.

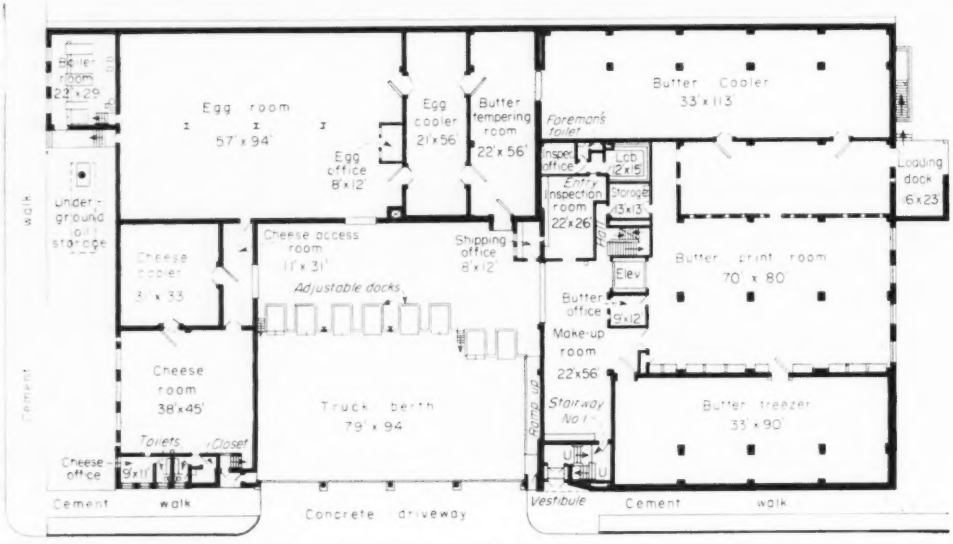
Next, the chocolate is leveled off and air bubbles are removed as the molds travel over a shaking table. Now, the molds make four passes through a 60-ft. tunnel-type cooler. Chocolate bars are then demolded onto an escalator-type conveyor which carries them to the air-conditioned packaging room on floor below.

Flanking each conveyor are automatic wrapping machines, which foil- and glassine-wrap the chocolate bars. Speed of each machine is from 60 to 150 bars per minute.

In processing 10-lb. cakes of chocolate coating, the product is pumped through continuous tempering units. Tempered chocolate is then delivered to depositing machines that feed 10-lb. lots into metal pans traveling on a chain conveyor. Pans then continue through a continuous cooler. Finally, the cakes of chocolate are automatically removed from the pans and packed for shipment in 50-lb. lots.



ENCLOSED TRUCK DOCK centrally serves all processing areas in the new H. C. Christians plant. Cold storage building (rear) formerly housed company.



PROCESSING AREAS, all on first-floor level, are arranged for "circular" product movement from incoming truck to shipping at same dock location.

Handling Gains Spur New Plant

Power movers bring new life to old operation. But it took new building to unleash full cost-saving benefits of modern materials handling

GEORGE F. CHRISTIANS, JR.
Vice-President, H. C. Christians Co., Chicago

Results with its first automatic materials handling unit are a real eye-opener in any plant. But as a mechanized system is enthusiastically built up, a plant manager usually takes a new, critical look at his surroundings. Perfectly good ceiling heights, aisle spaces, and dock facilities all suddenly seem archaic.

When you reach that point in your thinking—in short, when you discover that a fast-developing materials handling system is hindered by plant layout—you have excellent incentive to locate in a new plant.

Such a situation and such thinking were pretty much behind our decision, at H. C. Christians Co., to build a new Chicago food processing plant, placed in operation at the start of this year. Consequently, our new establishment provides an ideal setting for mechanized product flow—through the following features:

- **Self-adjusting loading docks which route power trucks inside carriers.**
- **Self-leveling elevator which accom-**

HYDRAULIC RAMPS permit easy access of automatic trucks to loads in carriers. Here a palletload of butter comes into the plant.

AUTOMATIC DOORS serve all refrigerated and air-conditioned areas. Operator can work controls to open and close doors without stopping truck.

PALLETS ARE TIERED three high in commodious 40-deg. F. cooler. Cold air blower units and manifold supplying chilled Freon-12 are at ceiling level.

BULK BUTTER finally leaves the pallet in this tiled-wall stripping area. Ten stainless-steel "escalators" feed precut blocks to automatic packaging lines.

modates the loaded pallets and trucks.
▶ Underground tunnel which permits power-truck service to warehouse.
▶ Non-slip floors in the processing area which speed fork-truck movement.
▶ Floor layouts designed for efficient materials handling.

Many other construction and layout details of our new plant add to the above-listed innovations in superseding our old, partially mechanized system. But before reviewing the new setup in detail, it may interest those facing a similar problem to follow the thinking which ultimately led to building plans.

Something Had To Be Done

As packagers and distributors of butter, eggs, and cheese, we were pressed by wartime demands, which caused our previous plant area—30,000 sq. ft. on four floors of the Produce Terminal Cold Storage Building in Chicago—to rapidly become cramped and crowded with inventory. Incoming product was placed on platforms and pulled by hand trucks in several time-consuming passes between and across floors in process. And aggravating the situation was a strong trend to motor shipment at the time, accompanied by an understandable pressure from truckers for faster turnover of their hard-pressed units.

In an effort to speed movement and ease congestion, a driver-led power truck was installed, primarily to serve the route between loading dock and cooler rooms.

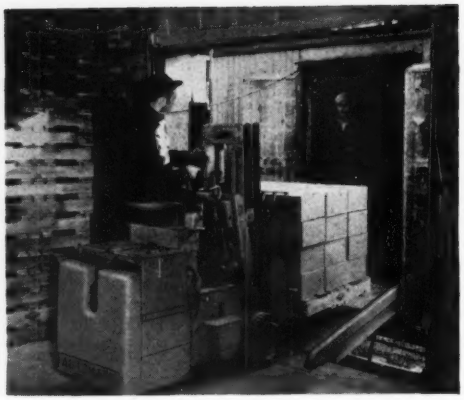
Immediate results with this first mechanized unit were so good that another soon was added, and our program of automatic materials handling was definitely launched.

Specialists Called In

With these first power movers already solving many problems in our operation, we began to recognize other and less obvious opportunities to improve handling methods. To help us integrate our approach to the overall problem, we then called in an engineer from Voss Associates and started to tackle the idea of converting our complete operation to a fork-truck pallet system.

First job was to design a suitable pallet for our sizable butter movement. We discovered that a 42x42-in. unit would fit our space limitations. However, in setting up a special pallet of this size, we actually had to redesign

BACK ON PALLETS, the consumer-wrapped butter is trucked to chill room, then shipping. Automatic moving speeds 17,000 lb. per hour through print room.



RAILROAD SIDING is also at approximate processing-floor level for low-cost mechanized loading of outgoing shipments into refrigerated cars by fork trucks.

our own butter carton to adapt it to the selected dimensions.

Our first pallet-handling truck was a tiering unit with a 2,000-lb. capacity and 108-in. telescopic lift. We immediately started to palletize incoming butter at the truck-receiving dock, with 27 cartons (each weighing 60 to 65 lb.) making up a unit load. The driver-ridden truck then delivered its load to a cooler for two-high stacking.

Our cooler in the old plant was relatively small (about 35 by 70 ft.) and had been a major bottleneck in expanding operations. We were astounded to find that the new system, with its faster movement and tiering, more than doubled room capacity.

Shortly thereafter, we tried the technique in our print room. Finished cartons here were placed directly on pallets and moved by fork truck into cooler storage. Utility of the system in this location caused us to add another high-lift truck and still a third was put to work soon after.

In a plant area which many believed could not support even one motorized unit, we ultimately had a complete fleet of power trucks, including the two original driver-led units for short hauls, three high-lift trucks for moving and tiering butter pallets, a pallet carrier to serve those areas where tiering was impossible, and a carrier-stacker which could be used for all moving functions.

Shortcomings Show Up

With an efficient materials handling system built up for butter, we soon began to notice that there were shortcomings in our plant which made full use of the system impossible. Another cooler, for example, had a ceiling so low that mechanical handling could not be used. And physical conditions in the space devoted to egg and cheese storage made palletizing impracticable.

By a comprehensive, yet limited, use of mechanized equipment, we had managed to effectively add about 60 percent more capacity to our plant. But we were finally at the point where further gains were impossible. At this time, a decision was made to build a new plant. Completely oriented to the materials handling system we had developed, it would have unlimited opportunities for mechanized equipment.

Everything on Pallets

In designing the new layout, it was resolved that everything—eggs, cheese, cartons, and other supplies—was to be handled on pallets which could be stacked three high. Further, all possible aids to industrial truck movement—hydraulic ramps, automatic doors, and a self-leveling elevator—were to be incorporated. We reasoned that such improvements would allow us to really approach the potential of our existent system.

It is gratifying to report that in our new plant the same truck fleet, primarily devoted to butter handling in our old operation, now handles *all* products automatically. And a ceiling on its ability to increase plant throughout has still to be reached.

Perhaps the greatest boost to industrial truck efficiency in our new facility is the totally enclosed 79x94 ft. receiving and shipping dock. Surrounded in a semi-circle by all processing and cooler rooms at the same floor level, this area can accommodate 8 trailer trucks at one time, and its current turnover is over 110 semi-trailers per week, plus many smaller cartage trucks.

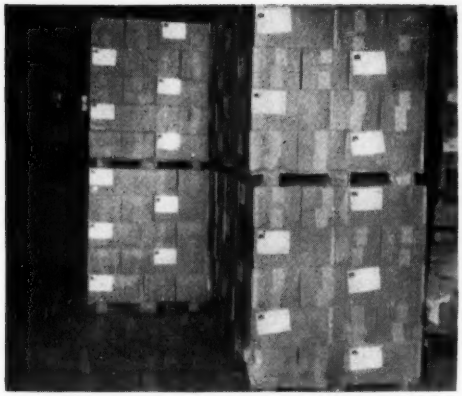
Speeding fork trucks in and out of the carriers are eight self-adjusting Rowe hydraulic ramp plates. These automatically raise or lower to the height of any truck and permit pallet building and movement from directly inside the carrier—now a one-man job, but it formerly required three attendants.

The adjustable ramps have proved highly effective in our operation. This equipment, recessed directly into the concrete loading dock, consists of a hydraulically tilted plate with a fixed hinge at its rear and a hinged lip, or bridge plate, at its forward end. As the load passes over the ramp onto the truck, and as the truck itself changes in level due to movement of its load, the ramp will "float" and thus prevent accidents due to sag and rebound.

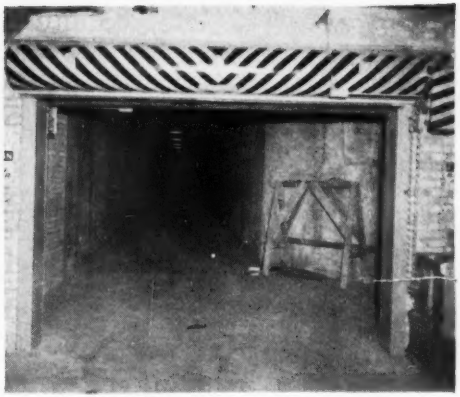
Besides eliminating a source of accidents normally associated with the manual "tossing" of bulky cartons, it is estimated that use of hydraulic ramps has cut the time required for loading and unloading by as much as 40 percent and has reduced manual handling by at least 60 percent.

Success of automatic handling in carrier trucks has suggested a further elaboration of our palletizing system. We recently received our first shipment of butter completely palletized in the truck. Unloading this with a team of fast-moving fork trucks can be accomplished in a matter of minutes, whereas pallet building in a good-sized carrier normally takes about 1 hr. We have already carried this procedure into shipping butter and plan on its ultimate use in egg and cheese handling.

Once on pallets on the loading dock, the incoming product describes



EXPENDABLE PALLETS come to the plant with paper shipments. These cardboard and wood units will be used for palletized product shipment.



UNDERGROUND TUNNEL, under railroad siding, connects new plant with commercial cold-storage building. Power trucks can ply corridor.

a "circular" route in its travel through cooler, processing area, and back to the dock for shipping. Bulk butter, for example, is moved on its pallet into an adjacent tempering room. The same pallet load then is tiered in a sizable cooler which adjoins the strip room where product is finally taken from the pallet and uncased.

In the strip room, butter is pre-cut and sent on stainless-steel escalators to the print room for packaging. The wrapped and cartoned butter is again loaded on pallets, which are tiered and held overnight in a +5-deg. F., air-blast freezer room. From the freezer, pallet loads of butter move to an order makeup room, and the exit door from this area leads, once again, to the shipping platform.

In this fast-moving circular path from receiving to loading, about 17,000 lb. of butter is packaged per hour under our own and many other private-brand labels.

Eggs and cheese are routed through the plant in a similar manner. Pallets of eggs are delivered to the candling department, where an automatic conveying system serves four stations for carton grading and six stations reworking and grading loose eggs. Pallets again move the graded and packaged product back to the platform for shipment. About 150,000 cases of eggs per year can thus be handled.

Speeding the movement of pallet loads is a series of automatic doors which lead to various refrigerated and air-conditioned rooms. Designed by the Jamison Cold Storage Door Co., these are hydraulically opened by control switches suspended from the ceiling. The truck operator merely reaches up and actuates each switch without stopping his vehicle.

Lending speed and surety to truck movement in the print room is a special non-slip floor made by Sparkle-Crete Co. This consists of concrete with durable granite chips embedded throughout. As the concrete wears down, the granite chips stand out on its surface and give excellent traction.

Tunnel Serves Warehouse

A bonanza to the new plant is its location just across a railroad siding from the sizable cold storage facilities of the Produce Terminal Building which housed our former operation. To expedite use of storage facilities, a 200-ft. tunnel was excavated under the tracks to directly connect our basement with the lower floor of the warehouse. Not only is this tunnel commodious enough to allow the travel of pallet-bearing trucks, but loads can be tallied and temporarily stored along the walls of the area if necessary.

Since much product reaches and leaves us through the basement tunnel, a 10,000-lb. Otis self-leveling elevator was included in plant plans so that full pallet loads could be raised to the first-floor processing area. This elevator holds four full pallets, or two pallet-loads and a fork truck. Its automatic leveling feature is designed for easy entry by a heavy industrial truck. If desired, the elevator can be controlled from the outside, and trucks at different floor levels can thus effect elevator loading and discharge.

Other Important Facilities

The second floor of the new plant is primarily devoted to paper and carton storage and office space. A rail siding serves this level and delivers paper supplies in boxcar lots. Lately, the paper companies have been supplying material already stacked on disposable pallets. These are unloaded by fork truck and tiered three high in the 80x115-ft., temperature-controlled storage area. Boxes are bottom stitched on this floor and chuted below to packaging operations as needed. The disposable pallets, as emptied, go below for use in butter shipping.

About 15,500 sq. ft. of the new plant, which has a total of 65,000 sq. ft. of floor space, is refrigerated. Five Freon-12 compressors, located in the basement, serve five separate rooms on the processing floor through blower units. Adjustable temperature and humidity controls are provided at each location.

Individual compressors, rather than one large compressor, are used to avoid an under-load factor during periods when refrigeration demand is low. In the winter, for example, less product moves through the plant, and cold outside weather requires that little mechanical refrigeration be supplied to the single −10-deg. F. freezer room and four 40-deg. F. coolers. A large unit would, under such conditions of under-load, build up a vacuum and suck oil into its compressor head.

Fork-truck batteries all are charged overnight through a bank of Hobart generators located at the rear of the loading dock. Operation of these generators and of the refrigeration compressors is automatically timed and sequenced during the night so that the plant's electrical load is balanced.

Two automatic oil-fired generators supply hot water heat in the plant. Hot water for clean-up is brought to 195 deg. F. by a gas-fired heater and goes to a 6,000-gal. holding tank which meets peak demands. Detergent pressure guns are spotted at various locations to aid in sanitation.

INSIDE-MEAT temperature check shows superior performance of re-engineered cabinet smokehouse at Armour.

NOZZLE assembly which discharges smoke and conditioned air into the meat-smoking chamber.

Cures Smokehouse Troubles

Armour corrects deficiencies of cabinet units to achieve continuous peak performance. Production and quality are up, maintenance costs down

PAUL SPEER and W. E. TRACY

Respectively, Engineering Department, Armour and Company, Chicago, and Sturtevant Division, Westinghouse Electric Corp., Chicago

Installation of cabinet-type smokehouse units at Armour and Company, Chicago, has increased total production, maintained quality, and lowered maintenance costs. But it wasn't that easy.

The evolution of the cabinet smokehouse was hastened by the need for complete control over temperature, humidity, air movement, and density of smoke. These variables, in turn, control finish, uniformity, shrink, and processing time. The old multi-story, chimney-type units could not allow any degree of absolute control.

When the cabinet units were first installed, there resulted not only positive control over variables but also huge savings in floor space and handling costs as a result of the more rapid turnover of the products. Furthermore, these units were designed to fit between four conventional building columns and existing floors of the building. So they were installed without costly alterations.

Gradually, however, production began to fall off somewhat. And each of the 40 installations at Armour was studied to determine the factors that prevented continuity of peak performance. These studies revealed that the roots of the troubles lay in misapplication of design within the equipment. The majority of these faults fell under one or more of these headings:

1. Inadequate humidity measurement and control.
2. Lowered heating capacity of the equipment.
3. Poor uniformity of ambient temperature.
4. Complete stoppage due to corrosion of ventilating equipment.

Humidity Control Corrected

The problem of controlling humidity and measuring it is difficult in smoke-laden atmospheres because of tar accumulation on the wicks. Furthermore, in a number of Armour installations, the water supply for the wicks was an overflow trough whose water velocity was high enough that the wet bulb recorded only the cold-water temperature.

By employing a type of cloth for the wicks that retained a wetted surface up to air velocities of 1,500 fpm., and by preheating the water to dry-bulb temperature prior to its entering the wick chamber, these difficulties were largely overcome.

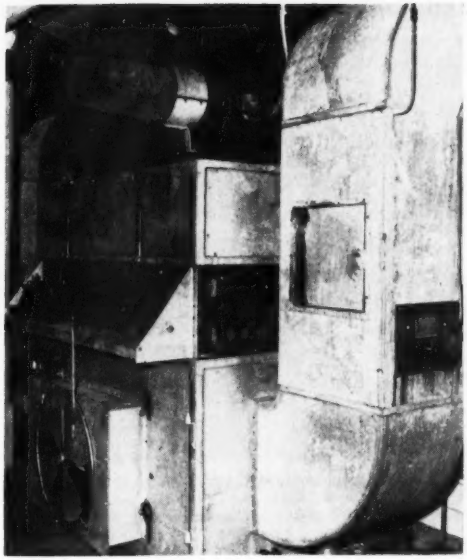
As added precautions, distilled water was used as the wetting agent, and float control was provided for the water level on the wicks. The instrument bulbs were also made more accessible to the operator.

Since these improvements have been made, very dependable humidity instrumentation has been available.

Heating Rate Upped

When the products enter the smokehouse, they must be evenly heated to internal temperatures in excess of 125 deg. F. as required by the government Meat Inspection Di-

AXIAL-FLOW FAN, which solves tar problem, is seen through opening, with nozzles in dropped position.



DAMPER and control are seen (bottom) on rear of smoke cabinet and axial-flow fan (at top).

vision. These internal temperatures are obtained by processing with an ambient temperature ranging about 20 deg. F. above the internal temperature.

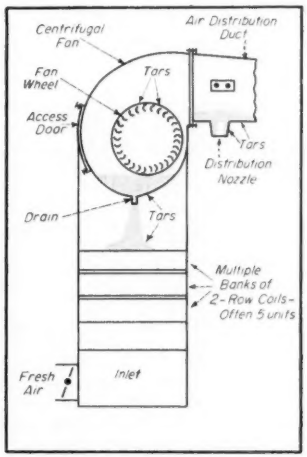
Two problems arise here. First, products must be brought into the smokehouse from refrigerated holding coolers, which usually have temperatures below 50 deg. F. This means, of course, that the product must be brought evenly through 20 or 30 extra degrees. Second, it is necessary to go through the critical range, in which bacteria thrive, as rapidly as possible. It is therefore imperative to be able to increase the temperature 10 deg. F. within less than 5 min. in the range 120-180 deg. F.

Specifying the Coil

In the installations where it was discovered that lowered heating capacity of the equipment had caused production lags, the heating troubles were largely due to accumulation of tars on heating coils and inherent deficiencies in the coils themselves. Frequent coil deficiencies were due to lack of sufficient face area in the heating coil surfaces, and closely spaced and frail fin structure on the heating surfaces that prevented proper cleaning.

The heating coil which could fill the needs had to have a sturdy fin construction, a rather wide fin spacing, and a large Btu. output per square foot of coil face. It also had to be easy to clean and be able to withstand strong alkali cleaning agents. A Sturtevant heavy-duty steam coil was found to closely fit these rather stringent conditions.

Ambient temperature is perhaps the most critical variable in smokehouse control. It is important that it be everywhere uniform around the product. One of the principal factors here is air circulation—ordinarily a fixed quantity of air determined by test.



TAR ACCUMULATION in conventional centrifugal fan is shown here. At Armour, axial-flow elbow fan avoids this condition. Axial wheel is at rear of chamber, with face perpendicular to air-distribution duct.

The smoke, produced by a selected sawdust in a burner located in close proximity to the smokehouse, is introduced into the system on the suction side of the fan through an ordinary 6-in. stove-pipe, and it represents a percentage of the fresh air supplied to the house.

"Knocking the Tar Out of 'Em"

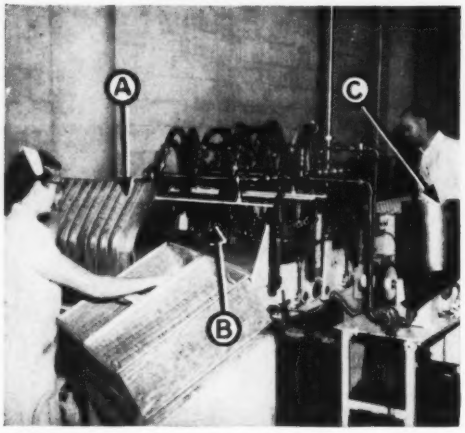
With the smoke-laden air, there is a tendency for heavy accumulation of tars in the ducts, nozzles, and fan housings, as shown in the diagram. These accumulations, of course, reduce circulation and seriously affect ambient temperature. Theses tars accumulate amazingly fast, and in some cases have caused complete shutdowns. Because of the friction between fan wheel and the tars, such accumulations must be considered as definite fire hazards. Armour has had several smokehouse fires in the past.

Belts for fan wheels and bearings must, of course, be kept free from tar. To achieve this, they must be located out of the air stream. These problems were again largely due to misapplication of equipment.

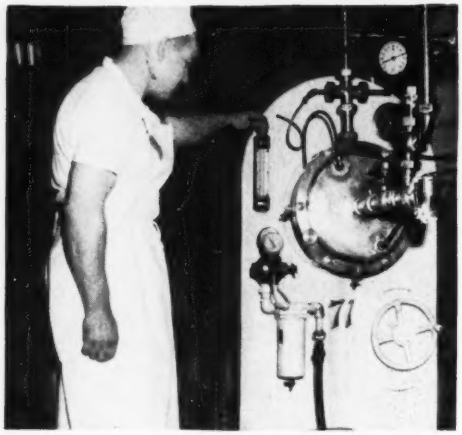
Instead of having an entirely new fan designed, Armour selected a fan

(Turn to page 159)

Jelly and 'Mallow Go on Cookies Faster, More Uniformly



1 FED into magazine (A), cookies are spaced on belt conveying them to jelly depositor (B). Jelly is pumped from hopper (C) to the reciprocating-type depositor.



2 MARSHMALLOW is continuously mixed in this continuous Oakes machine. Hourly, 1,200 lb. of 'mallow is piped directly to a second depositor under 40 psi.

New Depositing System
Tops 1,440 Cookies a Minute

Special multi-nozzle unit fed by continuous mixer ups output of improved product . . . Equipment highly sanitary . . . Further food applications projected

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Advanced process mechanization has paid off for Burry Biscuit Co., of Elizabeth, N. J.

This bakery has achieved versatile production of more uniform, higher quality marshmallow-topped cookies by installing a specially designed depositor with a continuous mixer.

An Oakes development, the new depositor performs at unusual speed. At Burry's, two of the units, operating together, apply first jelly, then marshmallow onto each row of twelve cookies at the rate of 1,440 per min.

Significant Advantages

While streamlining of the depositing operation was a specific objective, five other notable benefits were quickly realized:

1. Sanitation has been improved. The continuous mixer employed (also an Oakes machine) supplies marshmallow through a closed system to the hopperless depositor, which is of sanitary design and construction. One man can easily take the depositor apart and clean it. What's more, cleaning losses are negligible, since less than a pound of marshmallow remains in the entire system.

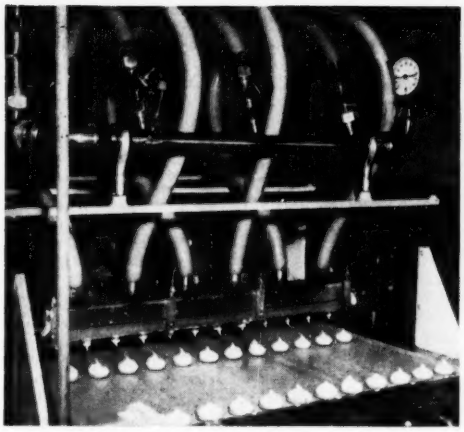
2. Less floor space is required. There is now no need for the old 40-ft. skinning table (on which the marshmallow formerly was cooled and set for 3-4 min. prior to being coated with chocolate). Marshmallow produced by the continuous method is firm and not free-flowing, and it is deposited smoothly and evenly.

3. Versatility has been attained in four ways. First, marshmallow can be applied to produce sandwich, open-top, or chocolate-coated goods. Second, two or more depositor heads can be installed on a line. If two units are used, one can deposit jelly and the other marshmallow on each cookie—in the Burry manner already described. Or, both depositors can be run on marshmallow or jelly to double the output. Third, by employing an assortment of depositing nozzles, fancy-pack items featuring marshmallows with different shapes can be applied to twelve or more rows of cookies traveling on the conveyor. Fourth, marshmallow of different colors—such as green and pink—can also be deposited.

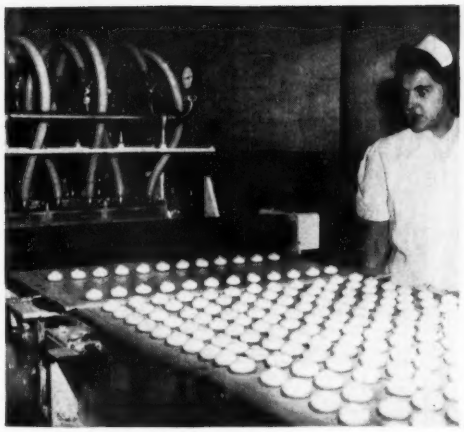
4. Rejects have been greatly reduced. Only 5-10 lb. of "cripples" in an 8-hr. run are reported with the new unit, whereas rejects have formerly been known to run over the 200-lb. mark in that period.

5. Quality of the goods is superior and more uniform, with weight losses curtailed. Marshmallow made continuously is better than that produced by the batch method, since it is smoother and more stable. (Nozzles are individually adjusted for uniform depositing.)

Also, a future big benefit is pro-



3 **HOPPERLESS** depositor then applies marshmallow to row of twelve cookies already jellied. Speed is 1,440 topped cookies per minute.



4 **LEAVING** jelly and marshmallow depositors (left), cookies travel under refrigerated roll that flattens tips. Cookies then go to coconut topper or enrober.

jected through further streamlining of operations, bringing an additional increase in output. Instead of loading cookies into a magazine at the feed end of the belt traveling to the depositor, they will later be directly conveyed from the continuous oven and cooler to depositor and then the shipping floor.

In so doing, additional floor space will be saved and trucks, base boxes for cookies, and storage rooms will be eliminated.

How New Line Operates

At Burry's, two girls hand-feed cookies from base boxes into a 12-compartment magazine. A reciprocating-type pusher-plate at the bottom of the magazine then slides a row of twelve cookies onto a 34 in.-wide sanitary conveyor. As the cookies travel along the belt, they pass under two depositors—one for jelly, the other for marshmallow. Speeds of depositors, magazine pusher-plate, and conveyor are synchronized.

Jelly is pumped, under 20 psi. from a stainless steel hopper through a pipe and a flexible plastic hose to the depositor. Attached to the pipe is a short Tygone plastic hose with a sealed end. This acts as an air chamber to take up pressure when the sliding valve on the depositor is closed.

Marshmallow (at 68 deg. F.) is piped about 20 ft., at a rate of about 1,200 lb. per hr., from the continuous mixer to the depositor, where the pressure drops from 40 to about 20 psi. By raising the pressure at the depositor, speed of the machine is increased.

Normally, the depositor runs at 120 strokes per minute. And, since there are twelve ejecting nozzles, the depositor applies jelly or marshmallow onto 1,440 cookies per minute.

Each depositor is built of stainless steel and comprises three parts—a small chamber for the jelly or marshmallow, a sliding-type valve, and a plate containing the twelve ejecting nozzles. Of 12-ft. overall length, the depositor is built in three widths—34, 42, and 48 in., for use, respectively, with 32 and 38 in.-wide band ovens and special installations. Depositing nozzles have regulating valves for adjusting the amount of deposit from a fraction of an ounce to several pounds. Consequently, accurate weights can be maintained across the width of the conveyor.

The unit in action: As the depositing manifold travels forward and directly above the cookies, the sliding valve opens and the deposit is made. Then the sliding valve closes, cutting off the flow of jelly or marshmallow to the ejecting nozzles. At the same time, the manifold moves upward so that the marshmallow tips remain vertical rather than being streaked back. The depositing head finally returns to its original position—directly over the next row of cookies.

Both jelly and marshmallow depositors travel forward and backward on a yoke, which is raised and lowered during the depositing cycle.

Leaving the depositors, cookies pass under a stainless steel, Freon-refrigerated roll. This continuously flattens the marshmallow tips, without cookies sticking to the roll. Cookies then continue either to the coconut topper or chocolate enrober.

Since the feed conveyor travels smoothly, rather than intermittently, operators are no longer required to straighten the cookies.

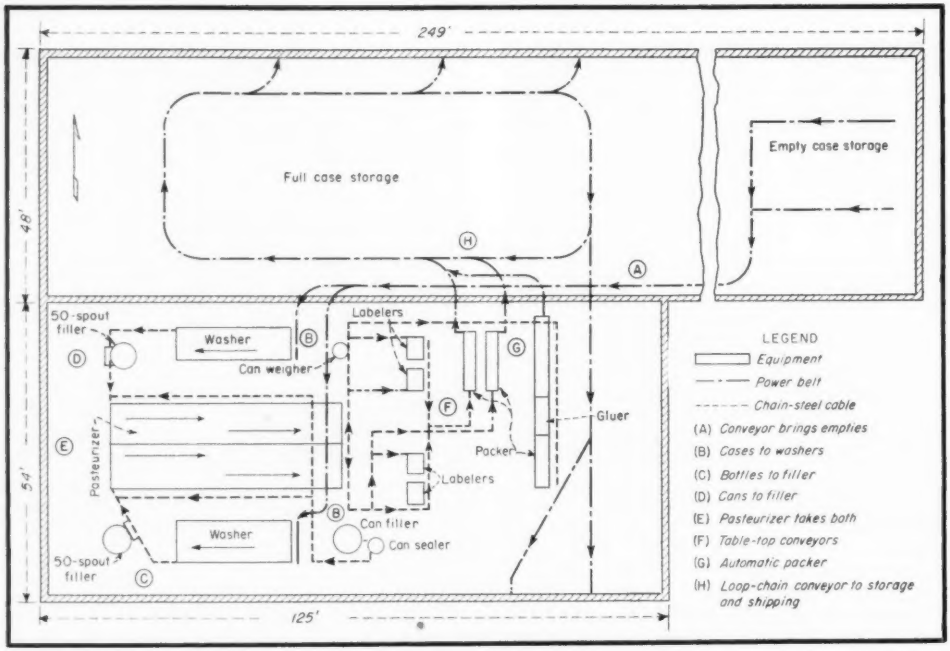
By installing two of these reciprocating-type depositor heads on one line, each handling alternate rows of cookies, total output can be jumped from 1,440 to 2,400 marshmallow-topped cakes per minute. With this system, each machine would make 100 depositing strokes per minute. Of course, to operate at this speed, it would also be necessary to raise the speeds of the conveyor and the cookie-pusher plate.

See Other Food Uses

Already moves are underway to broaden the application of the new depositor in the food industry.

Current tests are checking it for the job of depositing cake batters (sponge, pound, layer, and vanilla wafer) and sugar-fat icings (for sandwich-type cookies)—all prepared in the continuous mixer. And shortly it will be tried out for applying candy marshmallow as well as starch and pectin-type jelly confections.

Also, the depositor has possibilities as a filling machine for such viscous products as jams, mayonnaise, peanut butter, and mustard.



FLOOR PLAN of new facility shows ample elbow room despite amazing space economy in layout of equipment.

Big Efficiency in Small Area

Limitations of new bottling house are solved by "split" pasteurizer serving three lines—achieving remarkable flexibility and low cost

JACOB L. HARRIS

Production Manager, Fox Head Brewing Co., Waukesha, Wis.

Successful beer merchandising today calls for many sizes and shapes in package and carton. And here, perhaps, lies the greatest advantage of the large brewer—for his million barrel output can justify separate high capacity bottling lines for almost every package.

The smaller plant—because of space limitations and a realistic eye toward machinery purchases — usually can't take advantage of the very real savings in packaging costs offered by big volume efficiency.

Consequently, its up to the moderate sized and small brewer to couple imagination with engineering when planning to improve bottling facilities—for modest, unique boosts in this operation can add much to a healthy ledger and make a mark in meeting the pressure of large competitors.

When the time came recently for our organization—Fox Head Brewing Co., of Waukesha, Wis.—to upgrade its bottling facilities, we were determined to somehow achieve high-speed efficiency despite very limited space and unusual diversity in our package.

How We Solved Problem

Key to this dilemma proved to be creation of a "multi-purpose" pasteurizer, which today permits us to—

- **Run three complete packaging lines in a 54 x 125-ft. floor area.**
- **Handle 23 different packages with a minimum of line changeover.**
- **Provide additional production capacity per 8-hr. shift basis.**
- **Up production per man-hour and vitally reduce our unit package cost.**

First, a word about space and merchandising problems that we faced and their effect upon our planning—a not unusual situation for many brewers who are now modernizing.

Solving the Squeeze

When the decision was made to improve our bottling arrangements, an area between two buildings, measuring 54 ft. by 125 ft., seemed the most logical site. However, this small space would not permit a plan for two floors or more, and a 1½ floor design had to be settled on to retain a desired architectural relation.

Because of our great number and size of packages, perfect elasticity of operation was a paramount consideration. Our entire sales line includes 23 different packages cartoned in 8 different sizes. In addition there are 2 distinct inner cartons, 10 different

labels, 6 kinds of dividers, and multiple crown styles.

It was imperative, therefore, that the machinery itself, its placement, and the general building layout be such as to permit any package to be run on almost any line. And a limiting factor was our dedicated use of a flat top rather than a crown can—the latter would permit an interchangeability of canning and bottle filling units — therefore, three lines have to be installed in a space normally occupied by one.

Also, by necessity, the original thinking had to consider the modern demand for cleanliness and neat appearance, factors that have increasingly proved their physical as well as promotional value in recent years.

Since the pasteurizer is the most bulky and expensive unit in a bottling operation, considerable thought was devoted to the type and number that would be needed to serve three proposed bottling lines. Most commercial pasteurizers take up a sizable floor area and have a correspondingly large capacity—and we could not see any way to employ even two such units because of limited space and inability to match their total capacity.

Single Pasteurizer Used

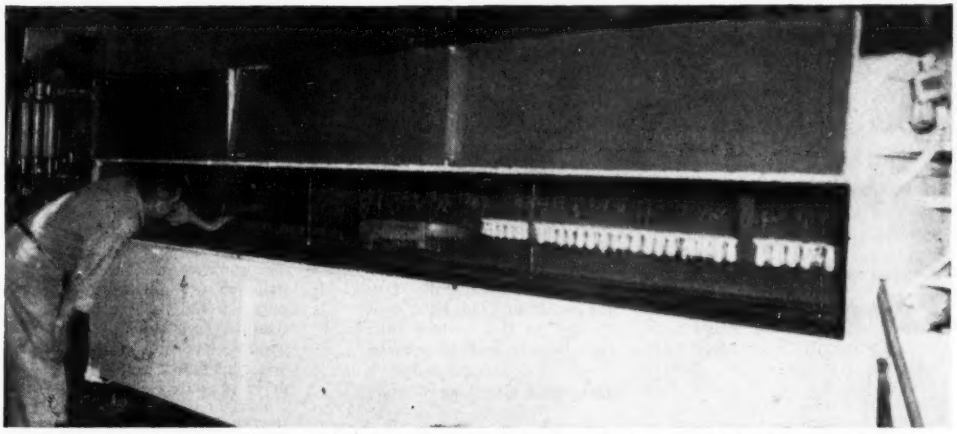
To solve this problem we conceived the idea of using a single pasteurizer "split" down the middle—with a separator installed—so that it could handle different-sized containers from two lines at the same time. Thus, quarts, pints, "nips," or cans could be run in any combination, even though there would be only one pasteurizer for the three different lines.

In carrying out this "split"-pasteurizer theory, we laid the basis of our entire design efficiency.

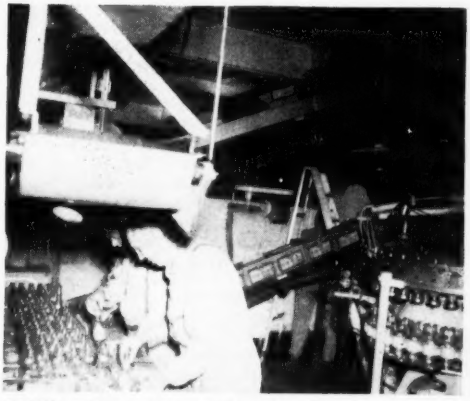
Early in 1949, the building was completed and equipment was set up according to our plan. The small area soon contained three complete bottling lines (two bottle and one can) with only two lines capable of operating at any one time.

Today, in a single 8-hr. shift using only two lines of men, the bottling house can produce over 8,000 cases of 24/12 oz. bottles. By replacing a 16-wide washer with a 20-wide and keeping all remaining equipment the same, this output could be upped to 10,000 cases.

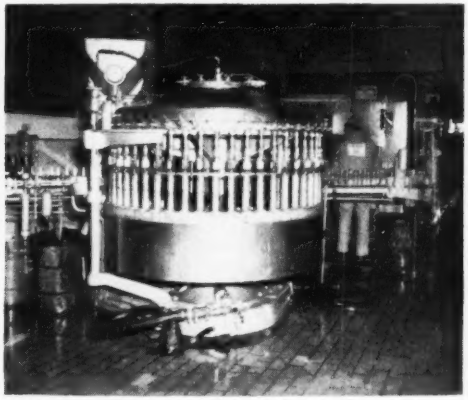
Top-Output Action on Highly Keyed Lines



FEED END of pasteurizer is "sectionized." Conveyor in left half of unit is lower to handle taller containers.



CASES go by gravity to washer, then off on overhead belt after emptying. At right is 34-can filler.



FROM WASHER, bottles go to this 50-spout filler. Filled bottles are seen (left) passing to pasteurizer.

Furthermore, this could still be done with our present 21 line operators—not including, of course, stitchers, empty case inspectors, stock men, etc.

House Flow Described

Here are more details of the movement in our new bottling house: Cases of empty bottles, after inspection for "strangers", are brought, via gravity and power belt conveyors, to two washers. After bottles are removed, empty cartons are placed on adjacent conveyors and moved by power belt to the balcony, where case inspection is made.

Stitching and case assembly operations are also on the balcony. Cases for refilling (those which have passed inspection or substituted new cases) —are then chuted down to the packers and refilled with bottles.

In the meantime, bottles pass through two washers—one built to handle quart or 12-oz. sizes, the other for 12-oz. and "nips".

After cleaning and sterilizing, containers are filled by 50-spout units and introduced to the pasteurizer. This latter machine is a Meyer Cataract that has been specially divided down its middle by a separator that prevents bottles—loaded from opposite sides of the feed end—from intermingling.

Closeup of Pasteurizer

Although the unit offered the desired flexibility, it was found necessary to pasteurize, for instance, quarts and cans at the same time. And the pasteurizing rate was, of course, different in each case. Therefore, an immediate modification was called for after installation.

Accordingly, it was decided to make different drives on each side of the unit. This was accomplished by splitting the carrier shafts at each end and putting in new bearings, then adding variable speed motors to drive both sides of the pasteurizer independently.

An integral part of this change was the establishment of new steam-pressure optimums tuned to the various speeds required by the different container sizes and materials. Both temperatures and times had to be experimentally determined.

In setting up for a run today, we simply adjust the speed drive and temperature controls to values established for the packages involved. Contributing to the system is the fact that smaller containers (which may be filled at higher speeds because of the smaller amount of beer required) can be moved through the pasteurizer faster due to their more rapid heat penetration. Thus, the flow in one side of the pasteurizer usually is more rapid than in the other.

At the unload end, the bottles are divided by table-top conveyors moving in opposite directions, then brought to four 8-wide labelers. A bypass around two of these labelers permits some packages having special vitreous-applied color labels to proceed directly to the packers.

After labeling, the bottles move through two packers. A slide-chute—descending from balcony level between the two packers—supplies cartons for the operation. This latter convevor is divided so that cartons peculiar to each line can be kept separate.

Integrated Can Line

A third line, the can line, starts at balcony level, where cans are unscrambled and passed down by twisters through a washer prior to filling in a 34-spout unit and sealing in a 6-head sealer. Filled cans are then transferred by cable to either side of the pasteurizer—again permitting a flexibility in combinations.

From Either Side

A typical pasteurizer run may involve two bottling lines, or one bottle and one can line. Hence, it is sometimes expedient to have cans supplied from either side. However, whichever side the cans run, they are eventually removed by special table-top conveyors at the end of the pasteurizer, because bottle handling equipment is not suitable for metal containers from this point on. After the cans are weighed and dated, they are transferred by cable to a separate packer.

One washer line is capable of delivering 168 of the 12-oz. bottles per minute or 128 of the 32-oz. size. The other washer handles 250 "nip" bottles per minute or 220 of the 12-oz. bottles. At the present time, cans are being filled at a 180-per-minute clip, but equipment is being installed to boost this production to 220 or higher.

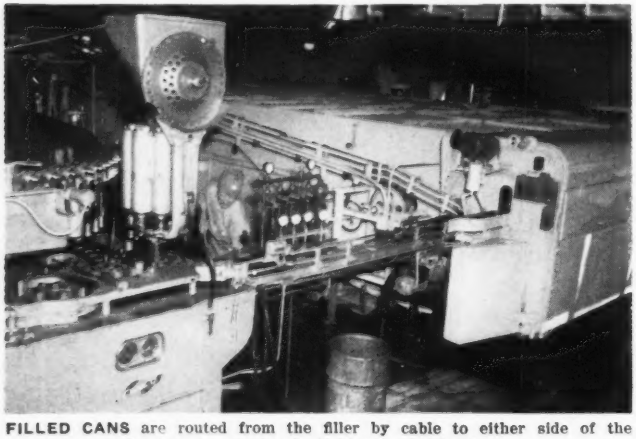
Loop Unit Does It

From the packers, filled cases pass to a loop chain conveyor in the full-case storage area. Here, again, installation of an elaborate conveying system would have used more space than was available or warranted. A powered loop unit satisfies the necessary requirements and uses a minimum of space.

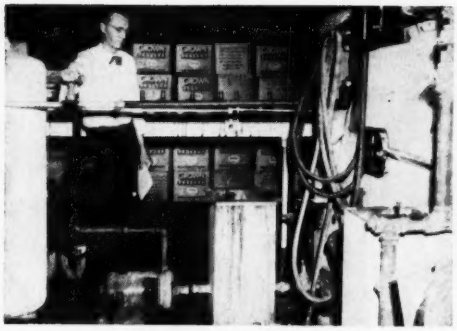
Production from any two lines enters the loop and is carried either directly to cars or trucks or removed at the designated storage area. At the same time, cartons of different sizes or for different designations are taken from storage and placed on the same loop to be transferred to the shipping department.

Thus, at any one time, there may be cartons of many different shapes and sizes using the same stretch of chain convevor. And through this simple but effective moving system we have been able to contain all of the active empty-case and full-case storage in a section of the building only 48 ft. by 249 ft.

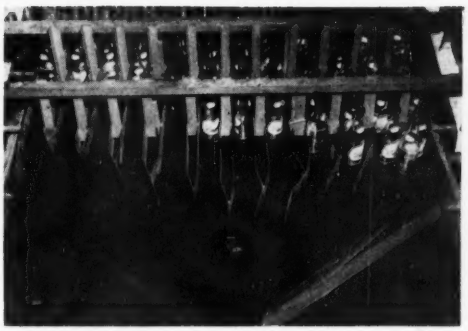
In working out the design of the new building and its equipment layout, the author wishes to acknowledge the valuable contributions made by Charles Kapps, president of Fox Head Brewing Co., Oscar Flatt, brewmaster, and Arthur L. Seidenschwartz, architect.



FILLED CANS are routed from the filler by cable to either side of the pasteurizer, which is set up to handle both cans and bottles.



FILTER SYSTEM removes gum from caustic solution to save detergent and avoid spotty bottles.



AUTOMATIC FEED for bottle washer, which releases two men for other work, consists of stationary guides.

Three Improvements In Bottling

Costs cut, productivity upped, quality aided by simple caustic filter, ingenious washer feed, and crown-cork-dust remover

EFFECTIVENESS of washer feed is shown by even distribution and unbroken flow of bottles.

E. P. BRINKMAN

Plant Superintendent, Nesbitt Bottling Co. of Ohio, Columbus

Three simple cost-saving, productivity-increasing, quality-improving innovations have been devised by Nesbitt Bottling Co. of Ohio, Columbus. One is a washer-caustic filter system. Another is an automatic washer feeder. The third comprises a crown-cork-dust remover.

No less that 32 dumpings of the 1,250 gal. of washer solution, each containing 240 lb. of caustic, were eliminated in one year by the filter system. The caustic solution formerly was changed after 60 hr. of use, and it took 1 lb. of caustic to wash 45 cases of quart bottles. Now 1 lb. of the detergent cleans 68 cases of bottles—a neat gain of 51 percent.

And instead of dumping the caustic periodically, it merely is necessary now to add makeup detergent to the solution as it passes through the open-top sump tank of the filter system.

Aside from saving material, the filter system assures gum-free washing solution and avoids spotty bottles. It also permits the washer to be operated at higher capacity.

Built by Nesbitt, the filter system consists of a 15-gal. sump tank, a 65-gal.-per-minute centrifugal pump driven by a ½-hp. motor, and an 18-in. dia., 5-ft.-high closed cylindrical tank containing a sand and gravel bed. These units are connected by pipes, and a water line is hooked to the filter for backwashing to remove gum from the filter bed. A perforated metal plate is inserted vertically into the rectangular sump tank to remove straws from the solution ahead of the pump.

The solution feeds by gravity from the discharge end of the washer to the sump tank, then is moved through the filter and to the inlet end of the washer by the pump.

Motionless Feeder

Like all progressive food processors, Nesbitt continually tries for higher worker productivity. And besides, the two men at the feed end of the bottle washer were needed to sort incoming bottles. So plant management applied its ingenuity and came up with an arrangement of baffles, or guides, which permits automatic, continuous washer feed without any moving mechanism. Most automatic washer feeders have an oscillating unit to nudge the bottles into position, but not Nesbitt's.

The bottle guides are mounted on overhead supports and are stationary. It took a little experimenting to determine just the right guide angles and lengths to attain uniform distribution of the bottles to the twelve washer rows as the bottles are moved forward by the wire-mesh feed belt. The final design and its effectiveness in feeding the bottles into the washer are shown in the photos.

Dusting the Corks

How to keep crown cork dust out of the bottled beverage is the third problem solved at the Nesbitt plant. And here again, the answer is quite simple. A water ejector mounted on the crowner pulls a vacuum on the crown chute. This causes the crown dust to follow the water and go down the drain.

PLANT'S daily processing capacity is 600 tons of lemons. It acts as hedge against over-production, with surplus fruit converted to numerous products. Legend: (1) Receiving, storage, grading, (2) Juice extraction, fruit and peel grinding, pulp stills, citric acid neutralizing, citrate drying, (3) Juice products building, (4) Pectin extraction, and (5) Finishing-packaging, (6) Juice fermenting, (7) Calcium citrate storage, (8) Citric acid house, (9) Power house, (10) Labs, product storage, bottle lines, (11) Peel dryer, warehouse, (12) "Gyp" beds, pulp beds, disposal areas.

They Use *Every Part* of Fruit In *Full* Product Line

Six separate, advanced processes extract "last drop of value" from lemons to yield numerous consumer products, food and pharmacopoeial intermediates, and stock feed . . . Oil and juice making detailed here

A. HARRIS KIESER and C. R. HAVIGHORST

Respectively, Production Superintendent, Exchange Lemon Products Co., Corona, Calif., and Associate Editor, "Food Engineering"

High-volume operations, ramified over a striking variety of quality products, and now representing an investment of approximately 6 million dollars testify to the exceptional strides made by Exchange Lemon Products Co., Corona-Covina, Calif.

When first launched to process cull and surplus lemons into byproducts, the company received only a negligible percent of the total Sunkist crop. But as lemon production and acreage mounted, activities steadily grew to reach present topflight proportions.

Specifically, this plant became a hedge against over-production. For growers no longer glut the fresh market during good seasons—instead they are able to maintain a delicate balance of supplies through diversion of excess lemons to this versatile plant.

Today six different, but integrated, processes extract the last drop of value from the fruit.

This all-out utilization began with the manufacture of citric acid. Then, when mechanical methods were developed, recovering and refining of expressed and distilled lemon oils were added.

Full Process Display

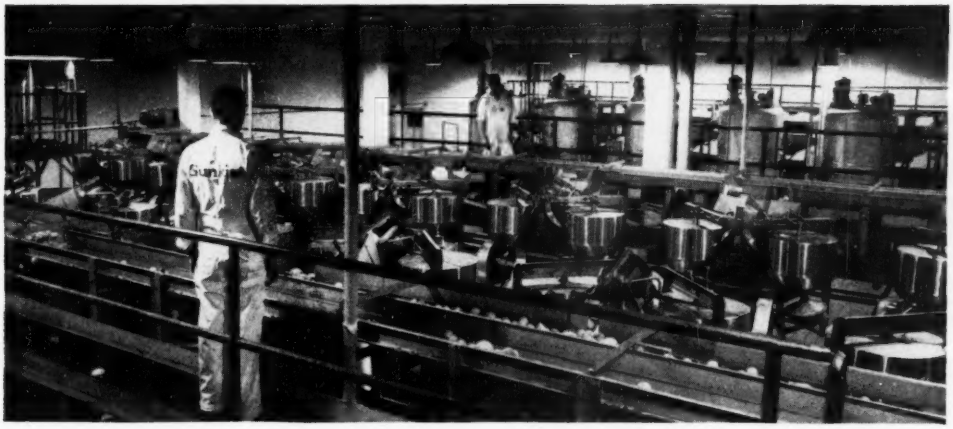
For a detailed, "right on the line" presentation of ELP's top-engineered lemon oil process, just turn to this month's FE Picture-Flowsheet. You'll find this special 4-page foldout on pages 136-139.

Soon it became apparent that an important market for pectin had developed in the commercial preserving business, so the company researched the properties of citrus peel as a source of this material, then began a small-scale pectin production. Also added was a peel-drying operation which produces stock feed.

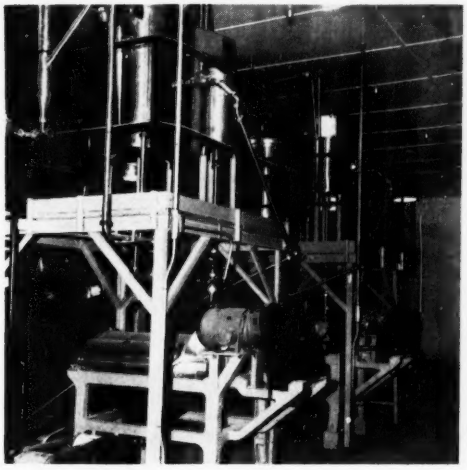
Although a modest amount of lemon juice was produced for sale to the carbonated beverage trade, significant expansion in this field did not occur until the company decided to enter the consumer market. Now canned are single strength juice, concentrated juice, and lemonade concentrate. Each is packed by two processes—pasteurized (not frozen), and frozen. All six carry the Sunkist label.

Since only one raw material is used in the manufacture of the six finished products, initial material-handling operations were both unitized and cen-

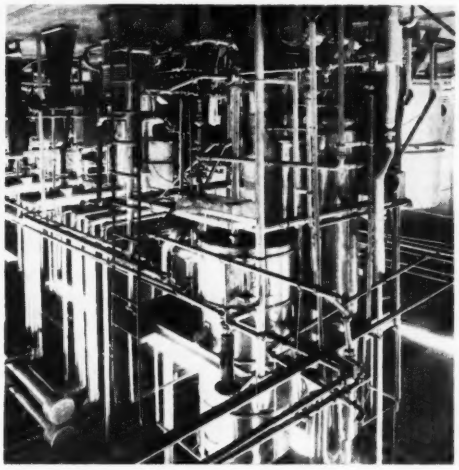
Major Steps in Juice Processing



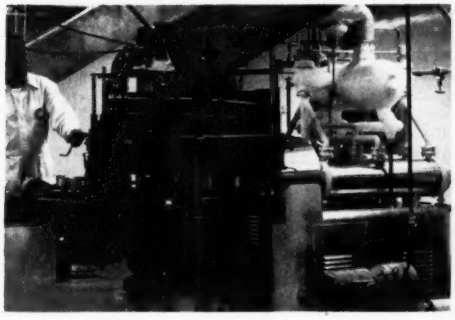
JUICE is removed from fruit by these 27 extractors (capacity 4,500 gal. per day). Peel then goes to oil recovery.



SURGE TANKS (top) receive juice from extractors, feed finishers below. Juice is then pumped to processing.



DE-OILER removes oil from pasteurized juice, which is then hot-packed in cans. Oil is recovered.



FOR frozen products, juice is chilled in Votator (right), filled in cans (left), conveyed to freezing tunnel.

DISCHARGE end of 85x21x22-ft. tunnel that has 4 tiers of 70x10-ft. wire belt. Temperature is —40 deg. F.

tralized, beginning with receiving and grading the fruit. Preparation of lemon oil and of juice will be detailed in this article.

Lemons are delivered in trucks having an average capacity of 22 tons, and are unloaded at a rate of 50 tons per hour. Trucks are hydraulically tilted at a 15-deg. angle, which causes the fruit to flow freely through the sliding gates in the sides and onto a conveyor belt. This means of truck unloading, devised by the company, eliminates manual shoveling. Also, it reduces truck maintenance, since the truck sustains no strains or twists as on conventional fixed-inclined ramps.

From the truck delivery station, a roller elevator moves the fruit to pre-grading on a series of belts which normally serve only to transfer lemons to the 280-ton capacity storage bins.

Representative samples automatically drop through a trap door in the roller-elevator and are analyzed in the laboratory for quality of flavor, acidity, and soluble solids.

Fruit approved for juice is belt-conveyed from the bins to sizing rolls that remove any that are too small for reaming. Lemons are then rinsed, sprayed with chlorine solution, and manually graded as they are rotated on the roller conveyors. They are then brush- and spray-washed with warm detergent, and next move under another series of chlorine sprays to the final inspection belt, second sizing rolls, and juice extraction room conveyors.

Equipment in this building is constructed largely of stainless steel to assure ease in sanitation, a clean appearance, and low maintenance cost. Belts are of plastic material.

The 27 extractors have a capacity of 4,500 gal. of juice per day. It flows through coarse and fine finishers, then is pumped through a 2½-in. stainless steel line to the finished juice building about 200 ft. distant. Undersize fruit, and lemon peel from the extractors, are conveyed to the start of the non-juice lines. Here, they enter the hoppers of the lemon grinders.

Lemon Oil

Much of the equipment used in the lemon oil process was designed by company engineers and built in the plant machine shops. They found that conventional machines were not always suitable, and the limited market did not encourage development of such highly specialized equipment by manufacturers.

Each of the feed-hoppers has eight plungers, which work on eccentrics connected to a central shaft. These units are powered in pairs by 3-hp. motors, but clutches permit independent operation. Plungers operate like pistons to provide a constant feed to the eight grinders below by eliminating the bridging of fruit above the entrances to these machines.

The oil-bearing juice produced by the grinders is separated from peel and flows to stainless, rotary, perforated (0.045 in.) reels, where lemon rag and pulp are removed. The reels are suspended on their drive chains from an overhead shaft, thus keeping the drive mechanism away from the corrosive juice.

The rag, which is wet with juice, is conveyed to a finisher. Here, most of the juice is extracted and pumped to the reel hoppers, where it mixes with that removed in these units.

Peel extruded from the grinders is a mixture of flavedo and albedo (materials containing oil and pectin). It is chuted to the pulp stills, where the oil is removed by distillation.

These company built continuous-type stills move the peel through live steam jets by means of an enclosed screw conveyor. Resulting vapors are condensed in a vertical vapor-tube, water-cooled condenser. Liquid then goes to a flotation separator for removal of the emulsified oil from the water. The oil is collected in 50-gal. drums and later centrifuged.

Macerated peel drops from the stills into flumes to be conveyed to the pectin department.

(Turn to page 156)

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LETTERS TO THE EDITOR

Should Have Told Court About Coffee Pressure

Editor's Note—A court decision indicating that a coffee-jar explosion was the result of negligence on the part of the packer was reported in the February FE article, "Legal 'Short Course.'" The following letter refers to that item.

Editor, FOOD ENGINEERING:

Your article outlining the packers' inspection obligations (p. 99, Feb. FE) was read with interest.

Some one failed to explain to the court what takes place when coffee is roasted and packed in tight containers. But it probably wouldn't have changed the decision if he had.

The temperatures of roasting are sufficient to break down the structure of the green coffee beans. Besides moisture, there are large quantities of carbon dioxide, carbon monoxide, and some aromatic gases generated.

If the beans are solid, waxy, and of recent picking, pressures up to 160 psi. can be developed in their structure, especially if the coffee is roasted rather dark.

If the coffee is not ground, it will take from six to seven days for the pressures in the interstices of the whole bean structure to drop to zero gage pressure.

You can readily understand that the finer the coffee is ground the quicker the gases escape.

A drip grind coffee will de-gas to zero pressure in about three days.

What happened in the case you report was that the lapsed time after the coffee left the roaster until it was packed in a tightly sealed jar was brief.

Perhaps this packer had a well-designed packing line.

This lapsed time might have been only 45 min., or even less.

Thus sufficient gases were held in the coffee to compensate for the vacuum and could create pressures in the jars up to 20 psi.

Most jars will stand such pressures safely, but unfortunately some have thin spots, especially on the shoulder.

Again, the jar might have been rapped against some object with sufficient force to rupture it, and the "explosion" would have been quite violent.

Safe jar-packing practice indicates that roasted coffee should be allowed to de-gas in the bean for about two days before grinding and vacuum packing in jars.

Coffee itself is an inert substance, but clearly no adventitious substance was added.

"Explosive" conditions were undoubtedly developed by the release of gases occluded in the coffee beans.

We conceived, developed, and put into production before the recent war the method of packing coffee under pressure. In this process, the coffee is ground quickly after roasting, then packed in cans in an inert gas, and the cans then sealed at atmospheric pressure. Although the cans after filling have approximately ¾-in. head clearance, the pressure created by the gases in the coffee will, within 24 hr., be in a range of 18 to 20 psi.

In developing the coffee-packing process, much was learned about pressures in containers.

In fact, we had to design cans with domed ends that would stand these pressures without buckling.—*J. E. Tone, Tone Bros., Des Moines, Iowa.*

NEW EQUIPMENT & SUPPLIES

Stripped View of Components

Unit Automatically Removes Pan Straps From Racks

This new unloader, called the Widget, automatically removes pan straps of bread from racks, after the proofing process. Following removal the pan straps are discharged, row by row, upon a conveyor which delivers them to the front of the oven.

The Widget provides a housing through which a monorail runs, or floor guides in case of floor racks. Within the housing and to one side of the rack, two sets of pusher bars are provided. These bars move horizontally, shoving pans off rack shelves onto a multiple-deck elevator. After pusher bars have retracted, elevator travels vertically so that elevator flights arrive at conveyor level, row by row. As elevator moves intermittently upward or downward, it discharges its pan straps to the conveyor.

Individual flights of multiple deck elevator are live-roll conveyors. As flights become aligned with discharge conveyor, live rolls go into operation and line of pan straps aligned with conveyor is discharged. After flights of elevator have been emptied, elevator moves down to next group of shelves of rack where second set of pusher bars empties the last of pans onto elevator.

At this time elevator starts moving upward, shelf by shelf, until all pans have been discharged from live-roll flights to discharge conveyor. During discharging of last shelves from elevator flights, emptied rack is removed from monorail by an automatic mechanism, and a new rack is brought into place to repeat the entire unloading cycle.

Lead photo shows unit with its exterior housings removed. Through centerline of machine can be seen overhead monorail system and its automatic pushing mechanism. To left, are the two groups of pusher bars which discharge pans from racks to elevator, at right, top position.

Motor, right central foreground, drives live roll surfaces of elevator flights, the drive sprockets, and chains which may be seen at right side of elevator. Motor is arranged to drive only one flight of live rolls as it comes into the unloading position opposite the conveyor, extreme right.

Counterweights, lower right, balance weight of elevator in its vertical travel, plus weight of pans discharged upon its surfaces.—*Read Standard Corp., 3191 Casitas Ave., Los Angeles 39, Calif. and York, Pa.*

Circle 117A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Insert Fittings Simplify Plastic Pipe Connections

Sharp turns or take-offs from flexible plastic pipe lines are facilitated with use of these new insert type ell and tee couplings. One fitting, states maker, now effects a connection which formerly required three or four.

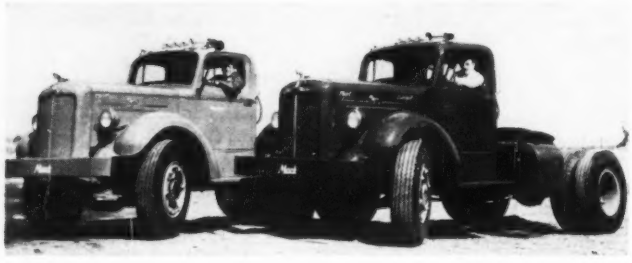
The fittings are quickly joined in the same manner as conventional insert couplings. Sections of pipe can be cut to desired length with an ordinary hand saw and fitting inserted. Stainless steel clamps are tightened over pipe and fitting, drawing pipe down onto the serrations of the insert to assure a positive, leakproof joint. Only tools required are saw and screwdriver, and connections can be completed in a very few minutes.

When flexible plastic pipe is to be joined to a metal fixture or a previously installed metallic system, an insert adapter is used. One end is screwed onto the metal threads, then the plastic pipe is slipped over the serrated end and clamped securely. Adapter threading mates with standard female threads.

All fittings are molded from a single piece of thermoplastic material that is guaranteed against rot, rust, and electrolytic corrosion. Their light weight is a feature.—*Carlton Products Corp., 10225 Meech Ave., Cleveland 5.*

Circle 118A on Reader Service Card

New Haulers Weigh Less, Carry More



These new tractors carry bigger payloads and still stay within legal limits.

By adding to tractor power and cutting chassis weight, maker has produced three models, the A-54T, A-55T (illustrated) and the A-54S (not illustrated), which will allow a bigger percentage of the GCW to be made up of payload.

Ratings on new units range from 45,000 to 58,000 lb. GCW.

A 158-hp. gasoline engine powers the A-54S and A-54T. The A-55T is powered by a 165-hp. diesel. Both the A-54T and A-55T are four-wheeled tractors and the A-54S is a six-wheeler.

Both gasoline and diesel engines are reported to have many features designed to give low fuel consumption characteristics.

Connecting rods are angle-split which permits use of larger crankpins for long pin life. Cap mis-alignment is eliminated, claims maker, by tongue-and-groove which locks bearing cap and rod together and relieves capscrews of shear.

Constant and uniform engine temperature is stressed as helping lubrication and increasing ring, piston and cylinder life. Cooling water flow is directed, company points out, so that coldest water reaches hottest parts first, maintaining close uniformity of temperature throughout engine. Thermostatically controlled warm by-pass and radiator shutters are used to maintain constant temperatures.

Other features which these engines have in common are full-length water jackets; case-hardened and generator-ground timing gears for maximum durability and quiet running with minimum backlash; flange-mounted gear-driven air compressor lubricated from engine system; and pot-type air cleaner to increase engine life. A new feature of the diesel engine in an ether-injection starting system, completely confined under hood and controlled from cab.

A wide selection of transmissions is available for the new tractors. Five-speed direct or overgear transmission is standard equipment on the gasoline-powered A-54T and A-54S.—*Mack Trucks Inc., 350 Fifth Ave., New York City 1.*

Circle 118B on Reader Service Card

All-Sanitary Trap Uses Grid Magnet

Increased separating action is claimed for this newly designed "full-

line", all-sanitary, magnetic trap. It is non-agitating to the product in the line.

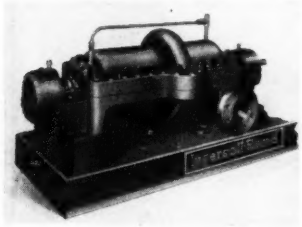
Recommended for use in processing lines of crushed vegetables and fruits, soups, juices and beverages, new trap features a "grid" type magnet having four or six pie-shaped segments, depending upon its size. This construction offers four or six magnetic gaps across which material can be trapped, as well as across the center of the magnet in any direction. Design is an improvement over previous use of horseshoe type magnet that has only one magnetic gap for trapping foreign metal.

In addition to increased effective magnet area, trap's body design which is wider and flatter brings product closer to magnet at a decreased velocity which aids trapping action. This body design reduces product agitation by elimination of baffle directing product toward magnet.

Traps are fabricated of type 316 stainless steel, available unpolished or with highly polished inside and outside surfaces, depending upon application. They are presently made in 2, 3 and 4 in. O.D. sizes, and are available with a choice of Acme sanitary threads; Van Stone ends; or with I.P.S. screwed ends.—*Tri-Clover Machine Co., Kenosha, Wis.*

Circle 118C on Reader Service Card

Split Casings Feature Multi-Stage Pumps



Higher efficiency and better operation are claimed for a redesigned line of horizontal, multi-stage centrifugal pumps for medium-pressure applications.

Called Class CNTA, pumps are intended for boiler-feed and general industrial services to 800 lb. Built in 1½, 2, 2½ and 3 in sizes, units are available with 4, 6 or 8 stages.

Pump features a horizontally split, smooth-bore cylindrical casing which contains a unit-type rotor assembly. Assembly is composed of shaft, impellers, and channel rings, which contain the multiple-volute fluid passages. Entire rotor assembly is quickly and easily removed from and installed in the smooth-bore casing, since there are no mating ring fits or alignment problems.

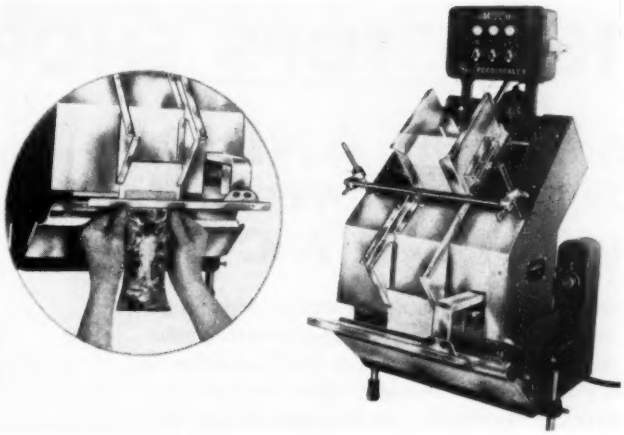
A balanced rotor is assured through modern, multiple-volute design, which eliminates radial thrust at all conditions of operation. Back to back grouping of impellers neutralizes axial thrust developed by pressure differential across each individual stage.

Interstage sealing method utilizes alloy cast-iron or stainless-steel piston ring around the outer diameter of each individual channel ring. These hydraulic-type, step-seal rings have a metal-to-metal fit with casing and are automatically placed under correct compression when casing halves are bolted together. They are highly resistant to corrosion and unaffected by high temperatures.

Ball bearings, ring oiled from their own reservoirs, are standard, although sleeve bearings may be obtained if desired. Stuffing boxes may be packed solid or arranged for injection or circulation, as best fits the application.—*Ingersoll-Rand 11 Broadway, New York City 4.*

Circle 119A on Reader Service Card

Automatic Unit Heat-Seals, Labels Bags



Cellophane, polyetheline, pliofilm, heat-sealable paper and foil bags are automatically sealed and labeled by this Hi-Speed machine with vacuum labeling attachment.

An operator places the filled bag into position and touches a hand-trip starter plate with back of her hand. The folding bar automatically guides bag top and label between jaws simultaneously with automatic feeding of another label by vacuum labeling attachment.

Labels with face widths from 3 to 7 in. are the range of sizes accommodated. Adjustments are readily made in feed magazine and chute section for different sizes. Labels can be folded flush back-to-back or shorter back and longer front.

There are two sealing jaws, each equipped with its own cartridge-type, hermetically sealed, heating element. This provides maximum heat penetration to inner sealing surfaces through label and both walls of bag. Pressure is variable and controlled by spring-mounted movable top jaw, assuring seal over entire width.

Heat is controlled automatically by dial type thermostat adjustable for particular label and film being worked. A tri-pod type mounting permits angling of sealing jaws for most efficient operating position.

Unit is 34 in. high, 19 in. wide and 27 in. deep. It operates on 110v a.c.—*Amsco Packaging Machinery, Inc., 31-31 48th Ave., Long Island City, N. Y.*

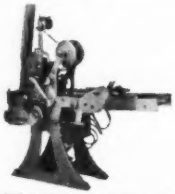
Circle 119B on Reader Service Card

IT'S MULTI-PACKING
in Cellophane . . .

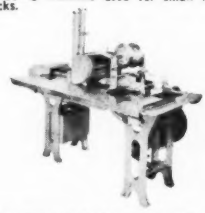
THAT STOPS SHOPPERS...

and it's SCANDIA
FOR FASTER, LOWER COST
MULTI-PACKS

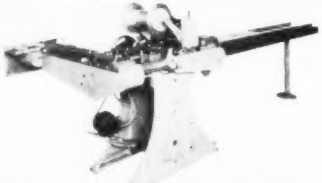
Transparent cellophane wrappings or multiple packages get most sales out of least display space. They're the thing today. And the best way to multi-pack the widest variety of differently shaped packages is the Scandia way. There are Scandia semi-automatic and fully automatic machines that are multi-packing goods like the above at the rate of 100 a minute and think nothing of it. What's more—no cardboard base, 30% less cellophane, and no scorching or "cooking" of goods by heat-sealing! Space provides a long list of products now Scandia multi-packed, or of the line of Scandia Machines. If you want to increase sales through lower cost and better Multi-packing, just write Scandia today. This is a new field, so you better get expert advice from engineers who know!



#1 Model STS-3 High-Speed (200 p.m.) Cellophane Wrappnig Machine used for small Multiple-Packs.



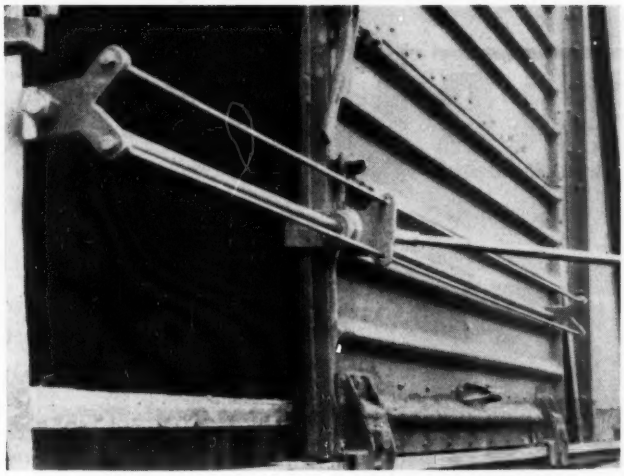
#2 Model SUS-6 Cellophane Wrapping Machine used for developing new Multiple-Packs (Avail-on rental basis).



#3 Model SFS-6 Medium Speed (100 p.m.) Cellophane Wrapping Machine used for larger Multiple-Packs.

SCANDIA MEANS MODERN *Multi-Packing*
Manufacturing Company
500 BELLEVILLE TURNPIKE,
NORTH ARLINGTON, N. J.

Device Simplifies Opening of RR Car Doors



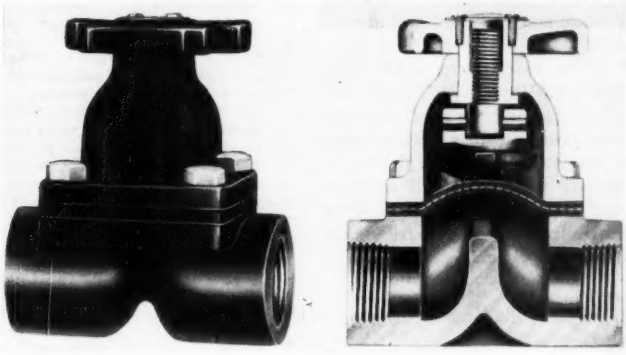
Months of on-the-job testing have gone into development of a new device that quickly, easily, and safely opens and closes "balky" freight car doors.

Known as the E-Z Way Door Opener, it is a mechanical apparatus of high-strength alloy steel with a built-in "lifting and holding cam. Unit exerts 4,000-lb. direct and constant pressure by a "jack action" stroke in direct line with opening and closing channel of all types of box car doors.

Weighing but 34 lb., opener can be transported by one man and applied in a matter of seconds. Its features are stated to eliminate accidents, loss of labor time, and freight car and merchandise damages. It can be used at any height of car door opening, off ground or off dock. Two small chains are provided to suspend device for one-man operation.—*Penco Engineering Co., 25 California St., San Francisco 11.*

Circle 121A on Reader Service Card

Diaphragm Valves Have Plastic Bodies



Corrosion resistance of Ace Parian, is combined with efficient Saunders diaphragm principle in these new general-purpose valves.

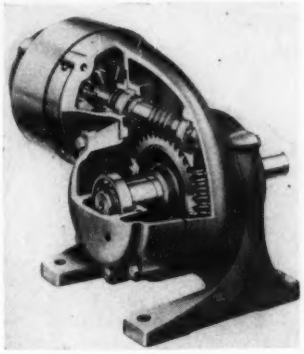
Termed tough, odorless, tasteless, and non-toxic, they are recommended for handling many food products, and wide variety of corrosive chemicals.

Metal never comes in contact with liquids handled. Valve body is molded of a plastic compound in the polyethylene family. Diaphragm may be rubber, neoprene, or polyethylene, as required. The bonnet assembly is sealed off from solution, and the valve has no stuffing box to leak. It can be serviced without removing from the line, and all parts are interchangeable.

New valves are available in all standard sizes from ¼ to 2 in. threaded for standard pipe threads. Its working pressure is 50 psi. at 77 deg. F. These diaphragm valves are also available with bodies molded of Saran.—*American Hard Rubber Co., 93 Worth St., New York City 13.*

Circle 121B on Reader Service Card

Angle, Worm-Gear Motors Operate at Low Speed



An entirely new line of low speed right-angle worm-gear motors is now offered.

Introduced as Type GW Synchro-gear, it is stated to present features not heretofore available in low speed motors. It incorporates a cantilever design to protect gear alignment. Mounting stresses are absorbed by a rugged single unit pyramidal base with "spread eagle" feet. Gear and motor housing are reported free from distortion. Embodied are splash lubrication, a hardened and ground worm, leak-proof oil seal, and asbestos-protected windings. Self-locking brake action is also a feature.

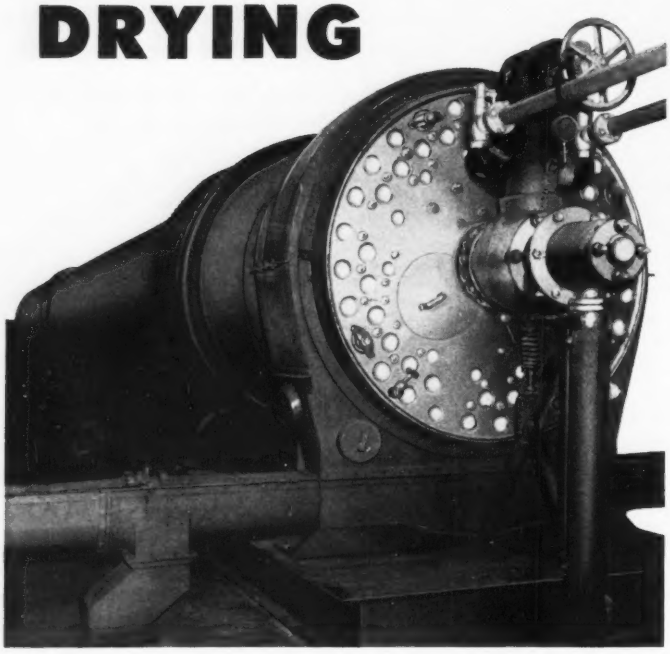
New motor comes in speed ranges from 20 to 155 rpm. and gear ratios up to 58:1. Horsepower runs from ¼ to 3.

Unit can be installed horizontally or upright, and it can be provided with a footless flange mounting. Other available modifications include variable speed, splashproof design, and total enclosure.—*U. S. Electrical Motors Inc., P. O. Box 2058, Los Angeles 54.*

Circle 121C on Reader Service Card

HOW THE HURON MILLING COMPANY obtains "*Cleanliness and Economy*" through

STANDARD-IZED DRYING



STANDARD-IZED drying pays! Read the case history at the right for another convincing proof of this fact. Why not let STANDARD-HERSEY "engineered for economy" drying methods go to work for you, too? Standard Steel Corporation possesses the experience, size, and facilities to handle *any* drying problem, *anywhere* in the world. STANDARD-HERSEY "Pilot" dryers are available at all times to pre-test products for customers and prospective customers. Write TODAY for complete 12 page Dryer Bulletin No. 524, describing the more than 30 types of STANDARD-HERSEY dryers.

One STANDARD-HERSEY dryer does work of 16 pairs of hot rolls, drying Monosodium Glutamate . . .

Excerpts from correspondence indicate effectiveness of STANDARD equipment in solving drying problems for Huron Milling Co., Harbor Beach, Michigan.

April 16, 1951

". . . a few years ago we were drying Wheat Gluten, the raw material from which we make our Sodium Glutamate, on rotating hot rolls at the rate of 97.8 pounds of product per hour, per pair of rolls. 16 pair of such rolls were replaced by one of your 6′ x 60′ steam tube rotary dryers. The single rotary dryer handled the product formerly dried on the 16 sets of rolls, although its capacity was somewhat taxed in the process."

"Improvement in Cleanliness - - - - Economy"

". . . one of our big reasons for going to the rotary dryer in preference to hot rolls was the improvement in cleanliness. What used to be a messy operation is now fully up to the high standards expected for a food product. Probably the largest saving is effected in reducing the manpower to operate the equipment—whereas, we used to have two men in a shift, a single operator now takes care of our rotary dryers."

(Signed)

THE HURON MILLING COMPANY

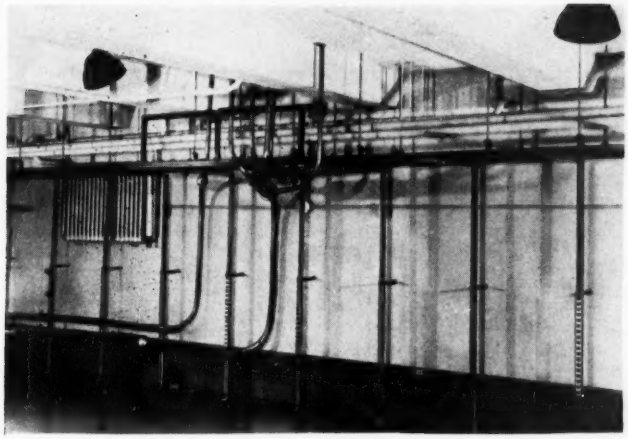
STANDARD HERSEY *Dryers*

STANDARD STEEL CORPORATION

5045 Boyle Ave., Los Angeles 58 ★ 419-45 Commonwealth Ave., Boston 15

STANDARD 1902 50 YEARS 1952 STEEL CORPORATION

Up-In-a-Jiffy Framing Has Many Uses



Headaches common to storage and materials handling are eased with use of this framing equipment, which goes together on simple principles like Erector-set models.

Mult-A-Frame, as it is called, makes possible the building of numerous sizes and shapes of storage racks, which can accommodate various food items, as well as pallets, skids, pipe, and the like. It can also be used as a support for conduits, radiators, heaters, ventilators, pipes, and as a hanger for lighting and other fixtures.

Three simple units make up the set. A channel frame of cold rolled steel comes in standard lengths, but can be easily altered to any desired length merely by sawing. A spring T-bolt locks into a continuous ½-in. slot on the frame, with serrations on either side of the slot permitting ⅛-in. adjustments. Safe-locking fittings provide rigid connections to prevent side sway or "jackknifing".

One wrench is the only tool needed to install the framing. Also, racks, supports, and hangers can be disassembled whenever required and the framing can be used again and again, thereby eliminating scrappage.—*Ainsworth Manufacturing Corp., Detroit.*

Circle 123A on Reader Service Card

Cleated-Belt Conveyor Whisks Small Items

This new, lightweight cleated belt conveyor is designed to move a peak volume of small items between production machines or into containers.

Ruggedly made, this unit, called the Press-Veyor, Jr., is portable for maximum usefulness. Compact construction permits installation in tight spots while cleated belt allows operation at steep inclines.

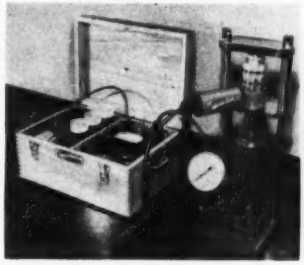
Conveyor is made in 4, 6, and 8-ft. lengths and 4, 8, and 12-in. belt widths to handle a wide range of products. Rigid 12-gage steel bed and guard rails are formed in one piece to prevent products handled from catching and being damaged.

Unit is available with woven cotton, Neoprene, or waterproofed woven cotton belts, with steel cleats spaced on 24-in. centers. Standard belt speed is 55 fpm.—higher and lower speeds are available. A choice of single or three-phase motors for 115 or 220-440v. is offered.

Convevor is mounted on a welded steel tubing base equipped with two wide-spaced steel wheels for stability. Unit is balanced, allowing one man to roll it easily from one location to another. Portable base may be removed and delivery end supported by a stand or hooked over side of a container. Head end of unit may be raised and lowered through a wide range of adjustment, then securely locked at any point with a hand-operated set screw. —*The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.*

Circle 123B on Reader Service Card

Speedily Determines Moisture Content



Accurate moisture content readings of non-metallic, dry granular materials can be made fast and easy with a new instrument, Model G5.

Instrument consists of four separate units: Master measuring unit; interchangeable range box; sampling unit, comprised of electrode and cup; and hydraulic press complete with pressure gage.

Master measuring unit remains the same for all applications. The other three units can be interchanged when necessary to test a wide variety of materials or moisture ranges.

Among features included in new G5 is a hydraulic press which eliminates need for accurate weighing and measuring of samples to be tested. In use, sample cup is filled, placed on a 5-ton hydraulic press and material is compressed to a pre-determined pressure as read on the dial of the built-in hydraulic gage.

Plug-in range box is then inserted at base of measuring cup, and moisture content of material is instantly read on a micro-ammeter located on master measuring unit. Any one of several range boxes can be selected for testing materials of wide moisture content range. Range boxes weigh 8 oz. and contain all electronic elements necessary to control sensitivity range of entire instrument. They can be sent

...*when you LEAD them*, that's game in the BAG

You have to shoot *ahead* of fast-moving game, if you want to take home something for dinner. Same with business. Now's the time to plan for the day when you can get all the materials you want, with allocations gone, orders maybe not so plentiful, and competition red-hot. ● Allegheny Stainless Steel can work marvels in adding sales advantages to the products you make, or reducing operating costs in the equipment you use. Let our Development Engineers show you how.

Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.

AL
TIME-TESTED
STAINLESS STEEL

You can make it ***BETTER*** with

Allegheny Metal

WAD 4088 B

intact to factory for quick, easy servicing when necessary.

Pressure exerted by hydraulic press is stated to guarantee more reliable and consistent readings. Granular materials vary widely in particle size and arrangement. Unit compresses sample to a solid cake, eliminating air and insuring reproducible results.

Another feature of register is the "suppressed zero" technique which spreads critical moisture range over entire face of micro-ammeter dial, giving more dial divisions for each percent of moisture content.

Register can be supplied either with battery power supply or voltage regulated line supply. When instrument is used on a power line, only 10w. are consumed.—*Moisture Register Co., Alhambra, Calif.*

Circle 123C on Reader Service Card

New Electric Chain Hoist Is Pushbutton Operated

Maximum efficiency and ease of operation is stated provided by this pushbutton control electric chain hoist newly added to the line of Comet units.

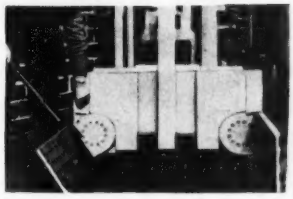
New model is available in capacities from 250 to 2,000 lb. Plug-in operation is possible from any single-phase lighting circuit, 220 or 440v. line. Regardless of voltage used, no more than 110v. pass through control station. Sensitive load control speeds up "spotting."

Other features are: "Herc-Alloy" double-duty flexible welded steel load chain, upper and lower safety limits, helical (spiral) gears, positive chain guide, precision bearings, fully enclosed mechanism, and permanent lubrication.—*Chisholm-Moore Hoist Corp., Tonawanda, N. Y.*

Circle 125A on Reader Service Card

Fork to Clamp Shift Takes 15 Seconds

Conversion from a conventional fork to a clamp in less than 15 seconds is possible with this new fork-lift truck accessory.

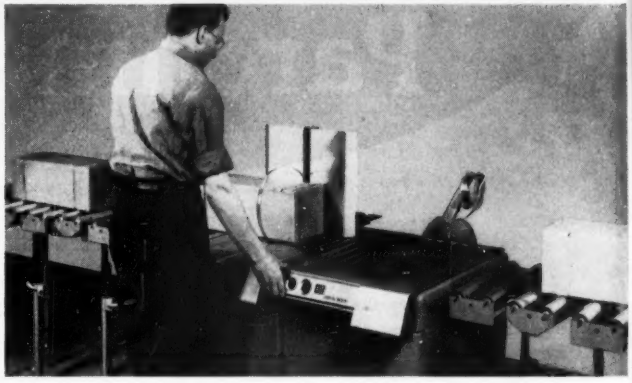


New Roto-Arm Clamp makes possible the use of lift trucks either with or without pallets. Accessory is operated hydraulically, with conversion from clamp to fork being accomplished manually.

Clamp is particularly suited to fruit and produce processing plants handling crated goods from field, and also to bottling plants and warehouses where packaged goods can be supported by bottom layer. Non-palletized operation offers savings in storage space used for empty pallets.—*Tansitier Truck Co., Portland 10, Oregon.*

Circle 125B on Reader Service Card

Machine Speeds Strapping, Makes Task Easy



High-volume flat-steel strapping operations are reported speeded and operator fatigue reduced by this power-driven machine. It produces spot-welded strap joints with strengths approaching that of the size of strapping used.

Machine can accommodate many different package sizes. There is no limit to amount of strap that can be fed.

The 31-in. table height permits installation in standard-height conveyor systems. Overall dimensions: Width 43½ in., depth 45 in., height 47 in.

In operation, packages approach on a roller conveyor from right and leave at left. Roller sections in table top facilitate location of packages over tensioning and welding unit, eliminating manual lifting. Fourteen ball-transfer rollers, built into table top around strapping mechanism, further eliminate handling operations by permitting packages to either pass over or be turned for cross strapping with a minimum of effort.

When a package is centered, oper-

West Carrollton GENUINE VEGETABLE Parchment

Gives Good Protection, too!

Fine foods deserve the *best* flavor-protection that packaging can provide. That is why so many packers of moist foods use so much West Carrollton Genuine Vegetable Parchment, year after year—thereby winning quicker and more lasting public acceptance. This parchment is ODORLESS, TASTELESS, GREASE-RESISTANT, INSOLUBLE and is STRONG, too, wet or dry. We can print it for you in one or more attractive colors (special inks)—right to your specifications.

DRY WAXED PARCHMENT
BUTTER WRAPPERS
BUTTER TUB LINERS & CIRCLES
BUTTER BOX LINERS

★

LARD CARTON LINERS
MILK & ICE CREAM CAN TOPS
SLICED BACON WRAPPERS
FISH FILLET WRAPPERS & INSERTS

★

VEGETABLE SHORTENING CARTON LINERS
CELERY WRAPPERS
OLEOMARGARINE WRAPPERS
MEAT WRAPPERS

★

LINERS FOR MEAT TINS
POULTRY WRAPPERS
CHEESE WRAPPERS
TAMALE WRAPPERS
MANY OTHERS

WEST CARROLLTON PARCHMENT COMPANY • WEST CARROLLTON, OHIO

ator simultaneously feeds out required length of strap by deflecting strap-feed pedal with his foot while guiding strap around package and into V-shaped guide slot in table top with his right hand. His left hand is used to hold package in place against back guide. Guide slot automatically centers and locates entering strap.

When strap is around package, operator actuates cycle bar under control panel with his right hand. Strap is thus tightened around package (to a predetermined tension), cut from coil, and then joined by welding. Entire operation takes a matter of seconds.

Design assures full safety to operator. Tensioning or welding is not possible while he is feeding strap, because he must first release his right hand from strap before he can use it to actuate cycle bar.

All strapping operations formerly requiring physical effort are reported done by the machine. Also, skilled labor is not needed.

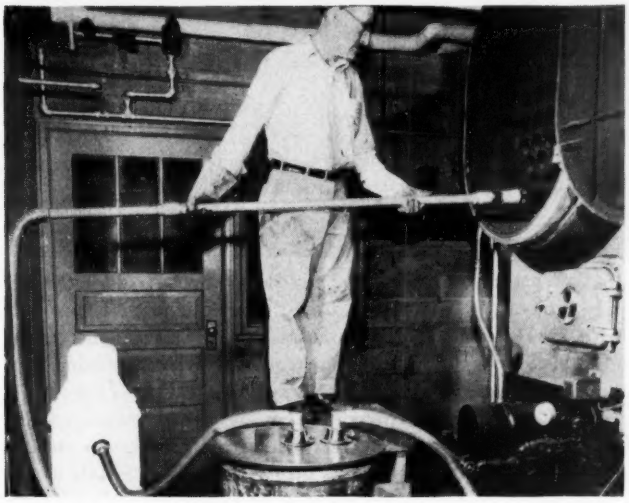
Machine is electrically powered and electronically controlled. Welding is on 230v., 60-cycle, single-phase, control on 115v., 60-cycle, single-phase.

Machine can be furnished to accommodate strap sizes in widths of $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ in. and in thicknesses up to .023 in. To facilitate record keeping for each shift, or for piece work, machine is equipped with a mechanism which records number of straps applied per day, per shift, or per operator.

A specially designed reel stand holds standard oscillated-wound 100-lb. coils of strapping. A coil quickly loads onto this reel without need for lifting. —*Acme Steel Co., Chicago.*

Circle 125C on Reader Service Card

Accessories Extend Cleaner's Work Range



With these new, heavy duty accessories, a regular industrial vacuum machine can be used on such large-volume tasks as furnace and boiler cleaning. Apparatus, maker states, can be used without danger of clogging tank and filters, getting ashes into the vac motor and bearings, or burning the vac hoses with hot clinkers.

With attachments, operator simply adds any standard 30-gal. (or smaller galvanized ash can) onto suction line of industrial vac. It works on either wet or dry pickup with any brand industrial cleaner according to maker.

Hazardous areas, too, are termed safely vacuumed without danger of explosion. Only ash-can assembly need be in the danger area, while vac is left outside and connected with a sufficient length of hose.

Parts of the "Add-A-Tank" outfit, as it is called, include: Cover plate assembly with 5 ft. of metal hose; 15 ft. metal hose assembly; extension pipes; flexible flue tool; flue scraper; and wire brush tool. — *Multi-Clean Products, Inc., St. Paul. Minn.*

Circle 127A on Reader Service Card

Vibrating Table Top Expedites Filling

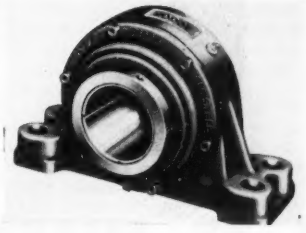
The filling of small products, such as candies, into containers is reported improved and speeded with use of this vibrating table.

Intensity of vibration can be varied by a pressure control regulator, permitting operation at 20 to 100 psi. line pressure. Vibrator, fastened under the table, is controlled by a knee valve. Table top, 12x18x1½ in., floats on heavy steel springs, and is 36 in. from the floor.

Standard equipment includes air line filter, automatic lubricator, pressure control regulator, and gage. Other models are available on special order. —*Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland.*

Circle 127B on Reader Service Card

All-Steel Pillow Blocks Have High Capacity



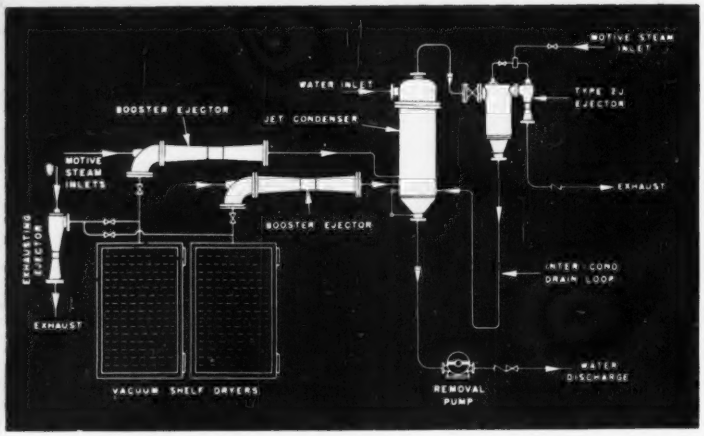
A new line of all-steel pillow blocks, providing high load-carrying capacity in a compact and rugged package, has just been announced.

New bearings are a joint achievement by Dodge and Timken, who

In food processing

C.H. Wheeler TUBEJETS

turn WASTED STEAM into USEFUL VACUUM



Wherever you have a drying, cooling or deodorizing problem, you may well be able to harness unused steam to vacuum with C. H. Wheeler Tubejets. Either live or exhaust steam can be used for high or low vacuum requirements by the combination of standard Wheeler units. Flexibility of design enables C. H. Wheeler engineers to combine boosters, one-to-five-stage steam jet ejectors, and barometric condensers to produce any vacuum desired. Single-stage units maintain pressures as low as 3.5 inches Hg and multiple stages, up to five, maintain absolute pressures below 250 microns.

Your inquiry will receive careful attention by a qualified Wheeler engineer, who will counsel you on vacuum problems at no obligation. Catalog No. 1462 should be in your files. A copy will be sent on request.

C. H. WHEELER *of Philadelphia*

C. H. WHEELER MANUFACTURING CO., 19th & LEHIGH, PHILADELPHIA 32, PENNA.

Steam Condensers • Centrifugal, Axial and Mixed Flow Pumps • Steam Jet Ejectors • Cooling Towers • Vacuum Refrigeration • High Vacuum Process Equipment • Micro Particle Reduction Mills • Marine Condensers and Ejectors • Deck Machinery

pooled their engineering resources and building experience. High radial and thrust capacities and the stamina to take heavy-shock loads have been provided within minimum dimensions with less than usual weight.

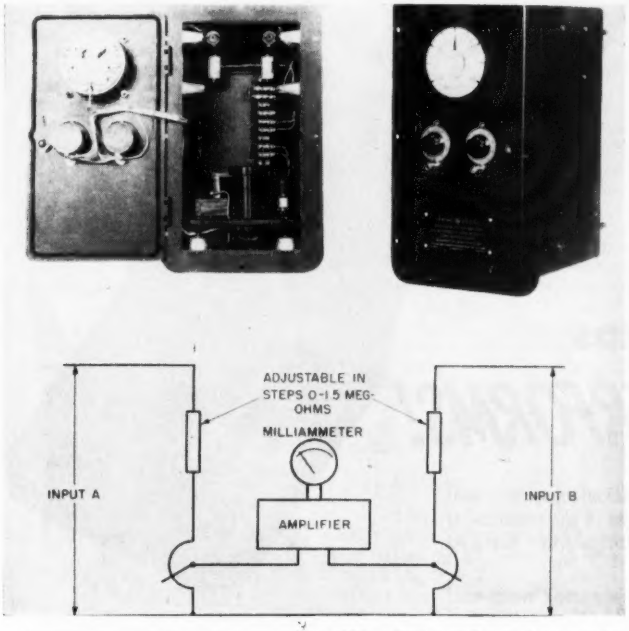
Bearings are fully self-aligning, with spherical outer race. They are available in both expansion and non-expansion types and have an adapter mounting.

Double piston-ring seals keep lubricant in, dirt and dust out of bearing mechanism. Bearings are sealed both on and off the shaft. They will be provided in shaft sizes from 2-15/16 in. to 10 in.

Pillow blocks are fully assembled, permanently adjusted, lubricated and sealed at the factory. They are shipped ready to install. Major applications are on crushers, heavy conveyors and similar rugged duty machinery.—*Dodge Mfg. Corp., Mishawaka, Wis.*

Circle 127C on Reader Service Card

Differential Voltmeter Measures Variables



Amperage, speed, pressure, and other quantities which can be converted to voltage can be measured by this new differential voltage indicator.

New device is basically a high-resistance precision voltmeter containing an electronic amplifier. It features a self-balancing circuit which possesses a high degree of stability and freedom from drift. It is capable of measuring a 0.001-30v. differential of two input voltages ranging from 1-400v. providing they do not differ by more than 300:1.

Instrument can be set to indicate full scale for voltages as small as 0.022v. Scale can be marked in volts, amps, feet per minute.

Used with standard accessories, such as a recorder, indicating instrument, or alarm relay, the differential voltage unit will record deviations at a point remote from the installation, or sound an alarm when deviations occur.

Illustration above shows internal construction of dust-tight enclosure (upper left), external appearance (upper right), and schematic diagram of meter which incorporates the electronic balancing potentiometer in the amplifier.—*General Electric Co., Schenectady 5, N. Y.*

Circle 129A on Reader Service Card

New Safety Goggle Frame Is Transparent Plastic

Use of a transparent plastic frame, on a new safety goggle, provides a greater field of vision.

New goggle is designed for wear directly over eyes or over spectacles. It is particularly useful for frontal protection against foreign particles on machine and hand tool work, bottling, chemical and physical laboratory jobs, and other hazardous tasks.—*American Optical Co., Southbridge, Mass.*

Circle 129B on Reader Service Card

Automatic Attachment Handles Two Drums

Different size drums can be carried two-at-a-time by this automatic handling attachment.

Operation of handler is completely mechanical, requiring no special hydraulic system components. It is attached to truck by clamping directly on forks.

In operation, driver tilts mast backward and engages rear hook, on each boom of attachment, with near end of each drum. Then by slowly moving truck forward and tilting mast forward, front hooks are engaged. Long tension springs keep rear hooks in contact with drums. Picking up load locks rear hooks for positive grip. To deposit load, procedure is reversed.—*The Yale & Towne Mfg. Co., Philadelphia 15.*

Circle 129C on Reader Service Card

DEPENDABLE!

DODGE SC
BALL BEARING
PILLOW BLOCK

EVEN AT LOW SPEEDS
THIS SEAL *PERFORMS!*

It's the famous Dodge metallic-backed neoprene seal that has proved itself in thousands of installations. It stays put. It can't blow. It keeps lubricant in—dust and dirt out—even at low speeds.

The SC Ball Bearing Pillow Block for small shafts and moderate loads, is a precision-built unit—a member of the famous Dodge 30,000-hour line. Modern styling . . . rugged one-piece semi-steel housing . . . long inner race . . . radial and thrust load capacity . . . fully self-aligning. Available from distributors' stocks in shaft sizes from $\frac{3}{4}$" to $2\frac{7}{16}$". Write for special bulletin giving complete specifications.

DODGE MANUFACTURING CORPORATION
2800 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

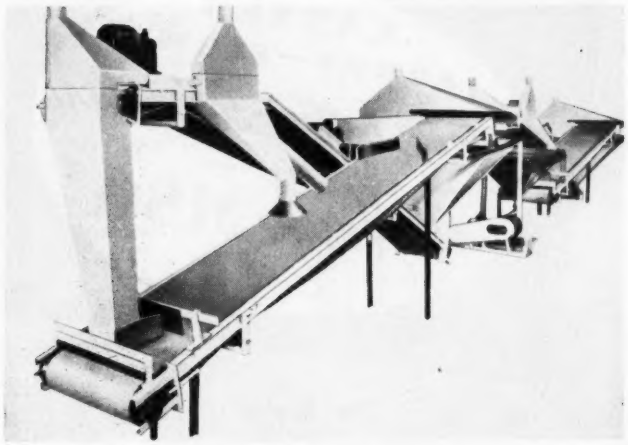
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

SEALED-LIFE V-BELTS AND TAPER-LOCK SHEAVES

DODGE-TIMKEN PILLOW BLOCKS

ROLLING GRIP AND DIAMOND D FRICTION CLUTCHES

Mechanical Unit Eliminates Hand Breading



Uneconomical hand breading of sea food, poultry, and meats is reported eliminated with this machine.

Known as the Harrison Breading Machine, it mechanizes the operation and in addition provides improved sanitation while cutting down waste of batter and breading. Further, batter and breading are stated to be applied more uniformly — giving product added eye appeal.

Only two operators are needed—one to feed stock, the other to remove breaded items.

A system of pump and conveyor belts "recirculate" batter and breading so none is lost. Products come in contact with only sanitary white, tasteless, and ordorless Neoprene and stainless steel wire mesh belts.

Unit is delivered complete. Installation of an overhead duct system to draw off breading dust is recommended.—*A. K. Robins & Co., Inc.*, 719 *E. Lombard St., Baltimore* 2, *Md.* (manufacturer and distributor) and *Food Machinery & Chemical Corp., Hoopeston, Ill.* (distributor).

Circle 131A on Reader Service Card

Incinerator Consumes Wet or Dry Refuse

Through use of this new commercial incinerator, savings in refuse hauling charges within six to twelve months are claimed to exceed the cost of the unit.

It is reported to completely consume up to 400 lb. per hr. of wet or dry refuse of all kinds. A smaller model consumes 100 lb. per hr. Less than a bushel of ashes is reported left after a week of normal operation. The G-20, largest model, does not require brick work or masonry. Thus, it is easily installed in less than a day's time.

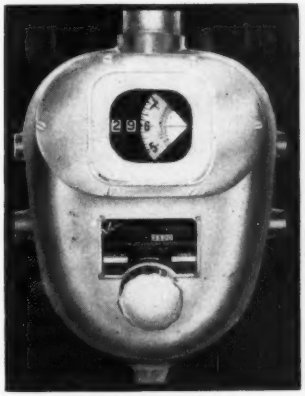
Practically all smoke and odors are stated to be eliminated through forced draft, a special ventilating system and secondary combustion. A hot, intense flame is delivered by twin burners using natural, manufactured, bottled gas or oil fuel. Operating costs are termed low. All models have a complete, heavy lining of refractory material.

Unit is easily loaded and fired and can be left unattended during day or night. Incinerator comes completely equipped with the latest safety devices. It is available with automatic timer to turn fuel on and off at preselected times—up to six times a day.

It is shipped knocked down, direct from factory. Installation does not require a mason or furnace man.—*The Winnen Incinerator Co., 932 Broadway, Bedford, Ohio.*

Circle 131B on Reader Service Card

Automatic Gage Checks Liquid Level in Tank



Fast and accurate checking of the liquid level in low pressure tanks is provided by a new automatic gage.

It incorporates a full-view, direct reading counter in a look box showing foot increments and having a dial for reading inches, and percentages of content. Neg'ator motor (patented) is housed with the gage head to maintain a predetermined constant tape tension and eliminate need for conventional counterweight.

Look box may be installed at any desired height. Unit is adaptable to all arrangements and types of low-pressure tanks up to 70 ft. in height. Manufacturer describes gage as easy to install, operate, and maintain.—*The Vapor Recovery Systems Co., Compton, Calif.*

Circle 131C on Reader Service Card

New Pack Protects Spuds in Transit

Shippers can now protect a carload of potatoes in transit with use of a new Tufflex "Spud-Pak".

Tufflex is a cellulose fiber felt made in various thicknesses and densities to meet special packaging, shipping, and cushioning requirements.

The pack consists of 14 pieces of

Huron MSG added to canned soups and stews makes them taste better—sell better. MSG brings out *more* of the *natural* flavors—makes the product taste better when served—and naturally sell better. Simply try it on your own products and see for yourself what it does for them!

Only a very little Huron MSG is required to strengthen the natural flavors—bring out all the hidden delicate flavors; as little as 2 to 3 oz. per 100 lbs. of finished product in most soups and stews does it. No change in formula required—just add a little Huron MSG—and taste the difference!

For FREE working sample of Huron MSG or technical advice, call or write Technical Service Dept.—

THE HURON MILLING COMPANY • 9 PARK PLACE, N.Y.C. 7

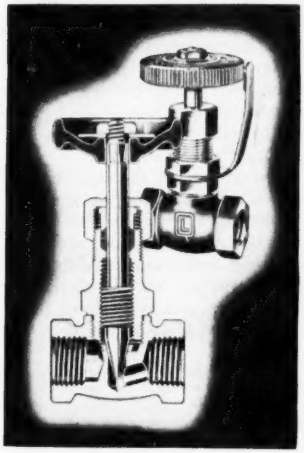
Factories: Harbor Beach, Michigan

Sales Offices: 161 E. Grand Ave., Chicago 1 • 383 Brannon St., San Francisco 7 • 13 E. Eighth St., Cincinnati 2

felt 27 by 88 in. with heavy kraft perforated paper on one side, designed to help ventilate and protect the spuds in shipment. The soft resilient material prevents the potatoes from burns and bruises and thereby reduces shipping damage. One unit of 14 pieces is designed to cover the floor of a standard refrigerator car. Space is left between the pads for additional ventilation.—*Wood Conversion Co., First National Bank Bldg., St. Paul, Minn.*

Circle 131D on Reader Service Card

Compact Valve Gives Pin-Point Control



On small lines where fine regulation of flow is essential, pin-point control is claimed for new, small and compact, gland-type, bronze needle valve.

It is manufactured in a full range of sizes from ¼-in. to 1-in. and in both globe (Fig. 906) and angle (Fig. 907) patterns. Handwheel is a new "Non-Slip" design, which lends itself to finger-tip control.

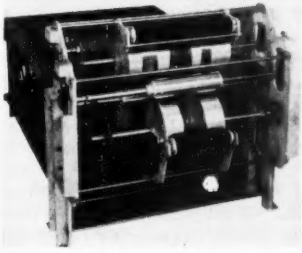
New control valve is also being produced in an indicator model. Indicator valve (Fig. 1565) globe pattern is available in ¼, ⅜, and ½-in. sizes; and (Fig. 1566) angle is available in ¼ and ⅜ in. sizes.

Handwheel on indicator valve is of cast bronze and has numbered graduations indicated on its face, permitting resetting to a predetermined degree of opening. A spring clip engaging serrations on outside wheel, holds valve at its proper setting.

Both patterns are made with deep, well-packed stuffing boxes and employ hexagon gland followers. Figure number name plates are on all valves to aid in identifying quickly. In illustration presented here, cross-section of Fig. 906 is shown in foreground, Fig. 1565 is in rear.—*The Lunkenheimer Co., Cincinnati 14, Ohio.*

Circle 133A on Reader Service Card

Box Printing Machine Has High Capacity



All sides of knocked down, corrugated boxes can be printed in one operation by this machine. It has a speed of 1,500 cases per hr.

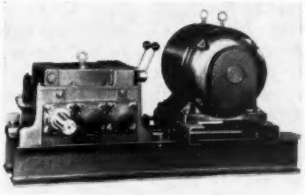
Quickly interchangeable rubber type or mats are employed. A quick drying, non-caking ink is used. Type and roller need not be cleaned after using.

Unit has adjustable side rails for various sizes of containers and spring loaded pressure rollers to compensate for container thickness.

It has an indexing arm on drum for centering the impression. Printing drums are made to provide space for multiple markings to identify contents, date of packing and other information.—*The Industrial Marking Equipment Co., 454 Baltic St., Brooklyn, N. Y.*

Circle 133B on Reader Service Card

Transmission Units Take Heavy Loads



Three new models of multi-speed power units for heavier hp. applications have been announced.

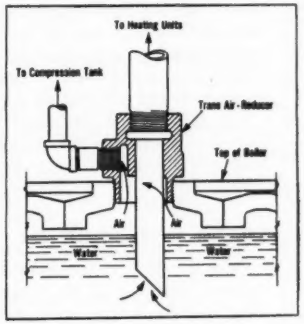
Models 2004, 3004 and 5004 transmissions are available in ratings up to 60 hp. Units are for use wherever it is necessary to vary the turning speed of electrically-driven equipment or machinery. Many installations are in connection with internal-combustion engines where it is advantageous to run engine at a constant speed and vary output speed.

They are available with two different type mounting brackets. Type RMB is a vertical mounted arrangement with motor on a hinged plate directly over transmission. Type H-Beam (illustrated) has motor mounted in front of or behind transmission.

Motor slide rails on H-Beam have both lateral and longitudinal adjustment to accommodate different frames and belt take up. Output shaft can be left or right, forward or rear.—*Turner Machinery Co., 3459 Terrace St., Kansas City 8, Mo.*

Circle 133C on Reader Service Card

Easily Installed Fitting Removes Air at Boiler



This new hot water heating specialty, the Air-Reducer, is an easily installed fitting for removing air at the boiler.

Design of unit, maker states, eliminates two adapter connections, thus enabling easier and faster installation. It is, in effect, a pipe within a pipe.

Brass inner tube extends hot water system's supply main below surface of water in boiler, preventing air from entering piping and heating units. Air collecting at top of boiler is bled off to compression tank through outer casting.

Further installation economies are gained by fitting reducer directly to the boiler, eliminating a nipple. Reducer is made for boiler and main sizes ranging from 1 in. x 1¼ in. to 3 in. x 4 in. in standard increments.—*The Trane Co., La Crosse, Wisconsin.*

Circle 133D on Reader Service Card

In Behalf of Progress . . .

Animal Fats In the Vegetable-Oil Fire

You can learn much about the facts of food life from the past, present, and predicted trends in edible fats and oils.

Everyone knows the story of lard. How it became a burden instead of a benefit to the meat packer after hydrogenated vegetable oil hit its stride. Packers have greatly improved lard to meet the competition. Yet they look to leaner hogs to reduce the supply of it.

All know the success story of margarine. Improved and enriched by technologists, it rode the crest of consumer demand over the political barriers of taxes and restrictions.

But you may not appreciate the full significance of the triumph of colored margarine. That marks the end of the sacrosanct attitude toward butter. It reveals the extent to which changing times have cut away the traditional political support for the animal fat. With domestic vegetable oils going into margarine, farm support for the product comes from the Midwest and the South to nullify or overpower that from dairy lands.

And this is the payoff: Many large dairy companies now are distributing margarine.

But this is not the end. Dairy manufacturers foresee as inevitable the use of vegetable fat to at least partially replace butterfat in dairy products—such as frozen desserts. And they are interested in the development of new types of dairy spreads which can compete with margarine on a price basis. Several firms already are marketing vegetable-oil toppings, or "whipped cream." And a cheese made from skim milk curd and vegetable oil has been patented.

Whether filled milk will make headway in future years is a question. But the economic pressures are there, and the opposing political pressures are weakened.

Anyway, "empty" milk—skimmed "blue john"—has attained dignity and is being bottled as "fat-free milk." It could have a good future. Containing nearly all the nutrients of milk except fat and vitamin A, it has the advantages of being a non-fattening, non-filling, refreshing beverage.

Still another blow to butterfat's supremacy is the increasing consumption of non-fat dry milk.

And technology rears its head in the vegetable vs. animal fat trend, too. Technical know-how is effecting a funtional interchangeability of food fats. And in the opinion of one observer, "in the not too distant future, it probably won't make a particle of difference whether our fats come from the cow, pig, steer, soybeans, cottonseed, or other sources of food fats."

So the idols fall in the field of food, even as in the sports arena.

Lesson in Productivity

Back in 1919, no less than 252.2 man-hours were required per unit of ice cream manufactured. In 1951, man-hour expenditure per unit was only 65.4.

Here is a neat four-fold increase in productivity in 32 years. This in spite of the fact that a much higher proportion of the ice cream now is put into small packages, and there are more flavors and types.

How was this achieved? A major contribution was the wide adoption of the continuous freezer. But that was by no means all. Mechanically refrigerated trucks permitted the use of easier-to-handle paper cans and eliminated metal-can washing. Mechanized materials handling took back-breaking work out of the operation. Ever more efficient and automatic forming, coating, and packaging machinery came into use. Easier-to-clean plants and machines were built. And labor-saving "chemical" cleaning methods for pipes and machines were introduced.

Yet the battle never ends. Today the ice cream manufacturer knows that his price is costing him sales. And if he is wide awake, he is using all efficiency-advancing methods and machines to correct the situation. In one plant recently, we saw work simplification and statistical quality control being applied, together with a couple of new forming and packaging operations and various time-saving practical devices.

Others can take inspiration from the job done—and being done—in leading ice cream plants.

British Man of Food

Seldom has one man done so much for so many. We refer to Sir Jack Drummond, recently killed in France, and to the British people whom he served.

Advisor to the Ministry of Food during World War II, Sir Jack not only devised an austere diet which was to improve the health of the British, but he had the personality to get the diet accepted.

Among his contributions to better health were 85-percent-extraction flour and two new foods rich in vitamin C—rose hip jam and black currant syrup.

When he took on the job of saving the starving in German concentration camps, Sir Jack made another nutritional discovery. He proved that a starving person could eat and digest some solids, thereby speeding recovery.

Americans who met Sir Jack when he visited the United States sympathize with the British in the loss of a great nutritionist, humanitarian, and personality.

take a CLOSER LOOK at

B&W STAINLESS TUBING DATA

Mr. Tubes—your nearby B&W Tube Representative—will be happy to provide additional information and to discuss any specific tubing problem with you.

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B&W offers a most comprehensive file of information on stainless tubing, both seamless and welded. The technical help this literature offers is exceeded only by the personal assistance on specific tubing problems you may expect from B&W field representatives.

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YOURS FOR THE ASKING

- ☐ TB-1 Properties and Methods of Working Seamless and Welded Tubes and Pipe of the B&W Stainless Croloys
- ☐ TB-11 Specifications for Seamless and Welded Tubular Products—Stainless, Alloy and Carbon Steels
- ☐ TB-15 Weight Tables, Round Seamless and Welded Steel Tubing
- ☐ TB-19 B&W Stainless Croloy Tubing Steels—Seamless and Welded, Condensed Technical Data
- ☐ TB-332 B&W Stainless Pipe, Seamless or Welded
- ☐ TB-335 Descriptive Terms, Steel Tubing, B&W Seamless and Welded Tubes
- ☐ TDC-130 B&W Stainless Pipe and Tubing—Croloy 18-8S (Type 304)
- ☐ TDC-132 B&W Stainless Pipe and Tubing—Croloy 18-8Cb (Type 347)
- ☐ TDC-133 B&W Stainless Pipe and Tubing—Croloy 16-13-3 (Type 316)
- ☐ TDC-134 B&W Stainless Pipe and Tubing—Croloy 25-20 (Type 310)
- ☐ TDC-138 B&W Pipe, Seamless and Welded—Carbon, Alloy and Stainless Steels—Dimensions, Weights, Specifications, Grades, Analyses
- ☐ TDC-140 B&W Stainless Pipe and Tubing, Croloy 12 Al (Type 405), Croloy 18 (Type 430), Croloy 27 (Type 446)
- ☐ TDC-143 B&W Stainless Tubing, Croloy 12 (Type 410) 12-2 (Type 414)
- ☐ TDC-148 Condensed Data on Working Seamless or Welded Tubing and Pipe—B&W Croloy Stainless Steels
- ☐ TA-1517 B&W Stainless Steel Tubing for the Food Processing Industry

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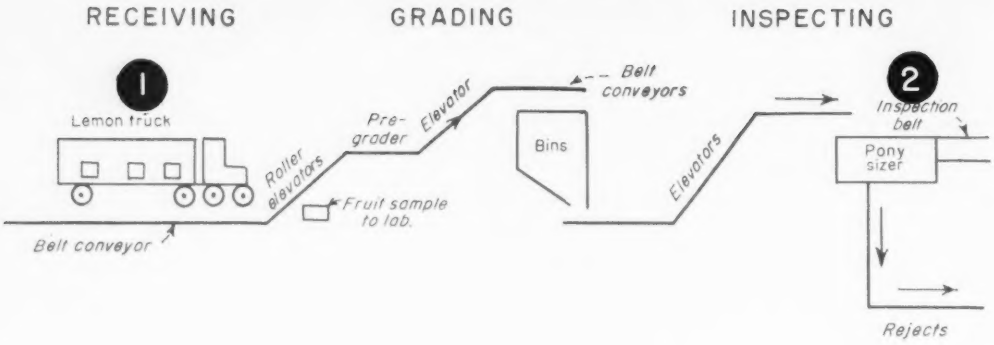


How Lemon Oil Is Made

Setup of Grinding, Pressing, and Steam Distillation for Maximum Extraction

PRODUCTION of high-quality expressed and distilled lemon oils by Exchange Lemon Products Co., Corona-Covina, Calif., termed the world's largest manufacturer of these items is portrayed pictorially and graphically in the accompanying flowsheet.

The product is delivered to the plant in large trucks. These carriers, equipped with sliding doors in the side, are automatically unloaded by tilting, the lemons dropping to a continuous belt conveyor.

Undergrade lemons from the grading and inspection departments or direct from the truck unloading station—Point (1) in the flowsheet—are belt-conveyed to a tub washer. Comprised of paddles on a central shaft driven by a 3-hp. motor, this unit removes extraneous material from the fruit and settles out metal which might subsequently damage processing machinery.

Bucket elevators then raise the lemons to a conveyor that feeds five large hoppers, each serving eight grinders.

Multi-Product Success

—has been won by ELP through the striking development of six separate lemon processes. This month's special article, "They Use Every Part of Fruit in Full Product Line," tells the story, with particular examination of oil and juice operations. **Just turn to page 114.**

Peel from extractors in the lemon juice line is also conveyed to these hoppers.

Each of the feed-hoppers has eight plungers which operate like pistons and provide a constant feed to the grinders below—Point 3.

The grinders produce an oil-bearing juice, and a macerated peel which is chuted to continuously operating steam stills for removal of remaining oil. Vapors are condensed, and the emulsified oil (containing about 10 percent water) is drawn off into 50-gal. drums. Final separation of oil from water is by centrifuging.

Juice from the grinders goes to rotary perforated reels for removal of lemon rag and pulp. Solids, as they are discharged from the reels, are transferred to a finisher. Here, the oil-bearing juice is extracted and returned to the juice line going to the feed tank in the 1st-Pass centrifuging stage. Rag from the finisher goes to the sump.

To get the cold-pressed oil from the juice, and to finally polish it, requires three different centrifuging operations. In the first step, the juice is pumped to a feed tank that supplies a bank of 23 separators, each at a rate of 100 gph. (1st Pass).

A part of the juice from these separators is fed to a still for recovery of residual oil, which is later centrifuged.

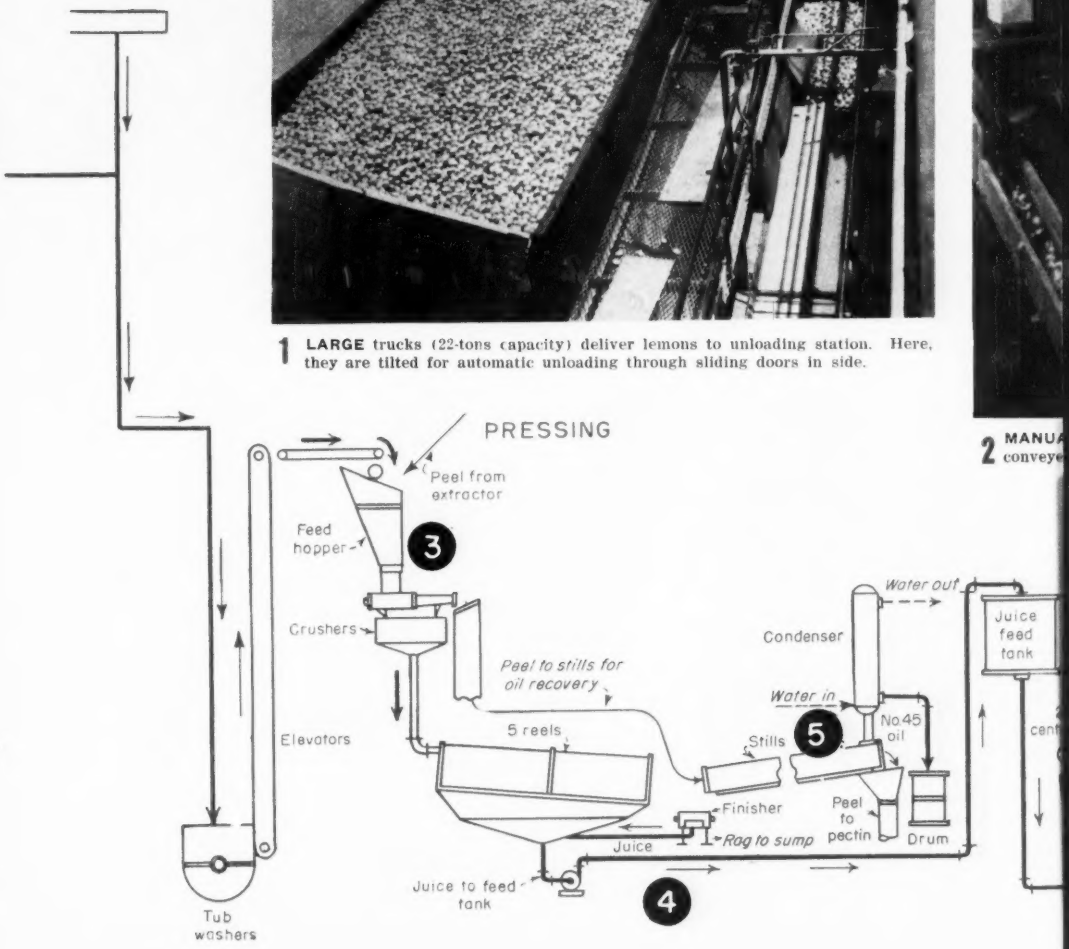
Oil from the 1st Pass is fed, at 15 gph. per unit, to three centrifuges that comprise the 2nd Breakdown. A small amount of water is added to the feed to facilitate removal of sludge from the oil. This sludge is later distilled for recovery of oil.

Polishing is accomplished in the 3rd Pass, where the oil is fed, at 10 gph., to two centrifuges. A small amount of water is added to this feed also. Waste flows to a refuse sump, while the oil discharges into 50-gal. drums, for storage.

Waxy, or stearoptenous constitutents, which are present in minute quantities in cold-pressed oils, are removed by a chilling process followed by centrifuging. Then the dewaxed oil is vacuum deaerated, blended, filtered, and packaged.

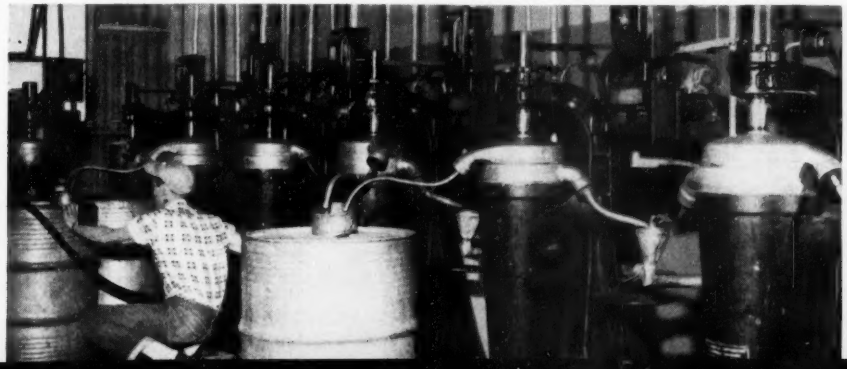
Distilled oils from the peel, 1st Pass juice, and 2nd Breakdown sludge are centrifuged to remove residual water, then blended, filtered, and packaged as above.

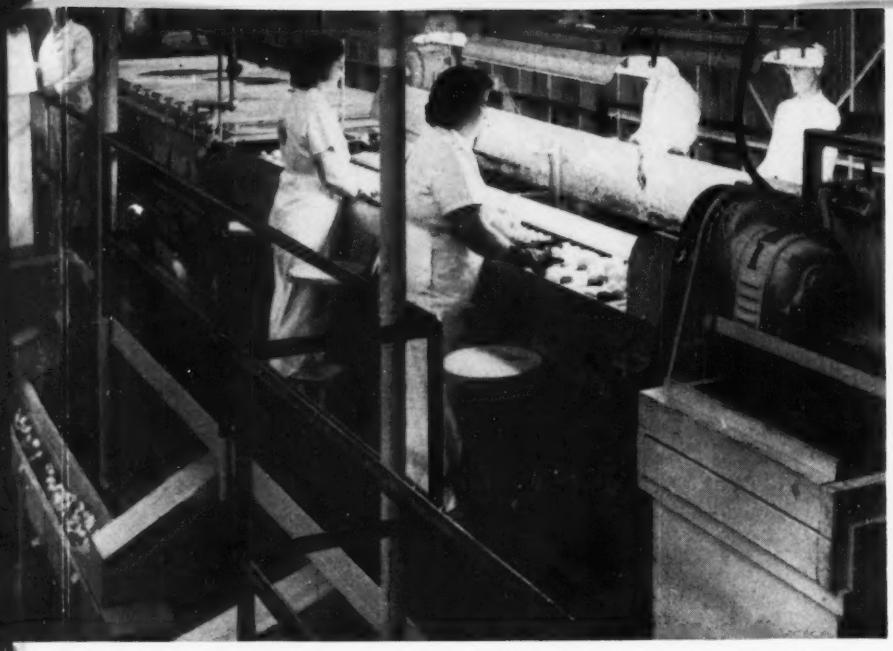
1 **LARGE** trucks (22-tons capacity) deliver lemons to unloading station. Here, they are tilted for automatic unloading through sliding doors in side.



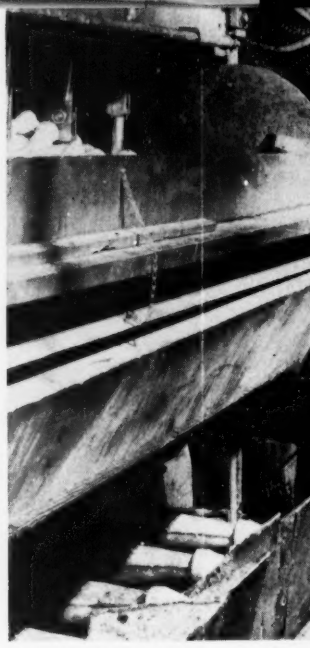
2 MANUA conveye

6,7,8 **CENTRIFUGAL** separators play important roles in production of high quality oils. Shown here is section of 1st Pass (23 centrifugals) where major part of juice is removed.

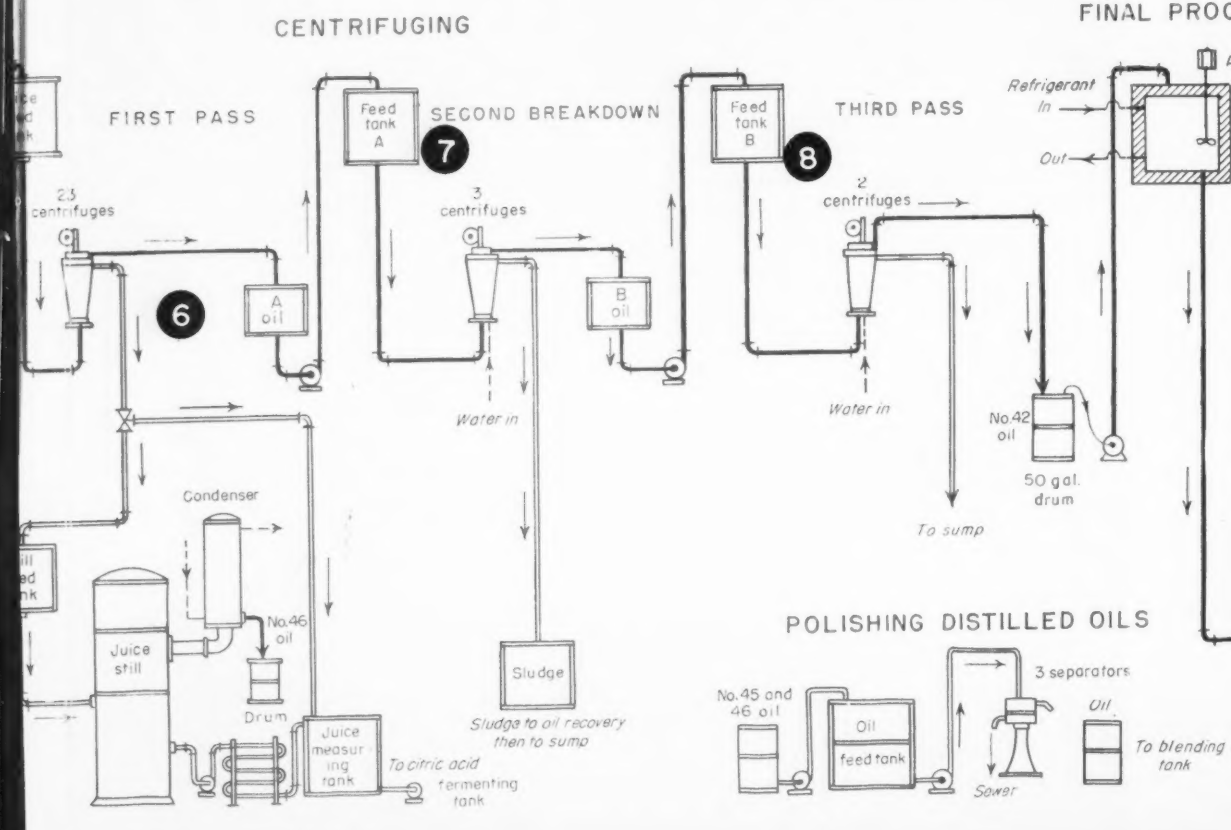


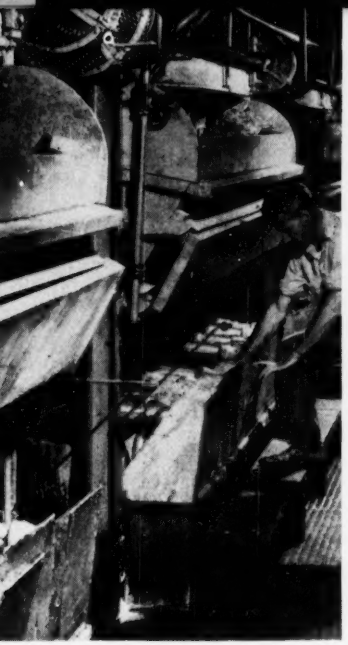


MANUAL inspection and mechanical size grading separate undergrade fruit from juice lemons. Former are conveyed to tub-washer for cleaning and removal of settleable matter, then elevated to grinder feed hoppers.

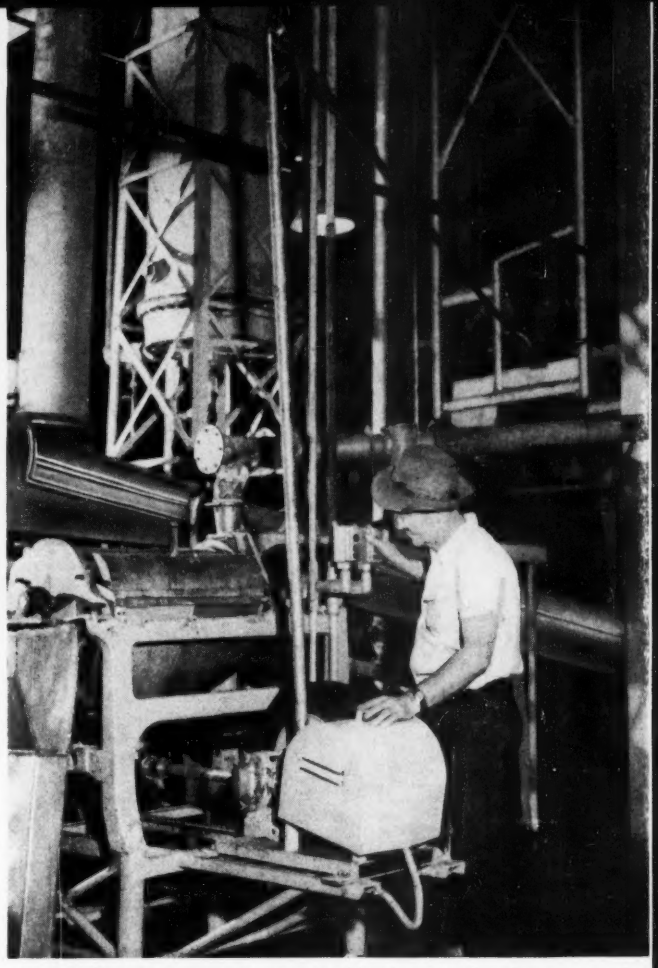


3 PLUNGERS (each of 5 feed hopp to provide uniform feed of lemons



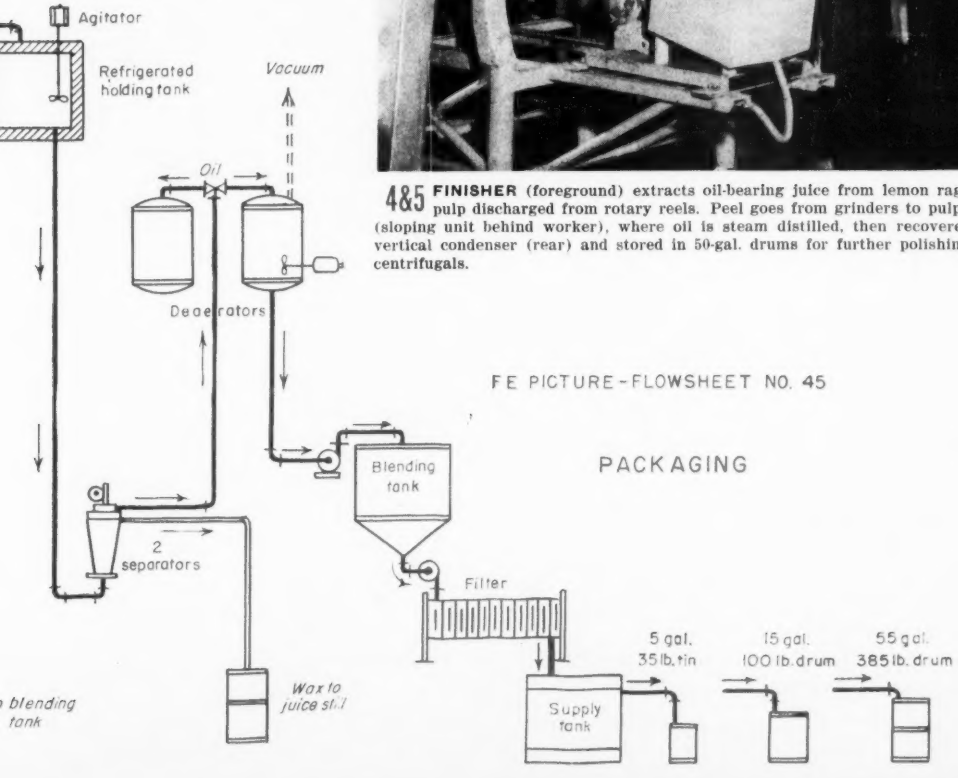


feed hoppers has 8) operate like pistons of lemons to 8 grinders below.



4&5 **FINISHER** (foreground) extracts oil-bearing juice from lemon rag and pulp discharged from rotary reels. Peel goes from grinders to pulp still (sloping unit behind worker), where oil is steam distilled, then recovered in vertical condenser (rear) and stored in 50-gal. drums for further polishing by centrifugals.

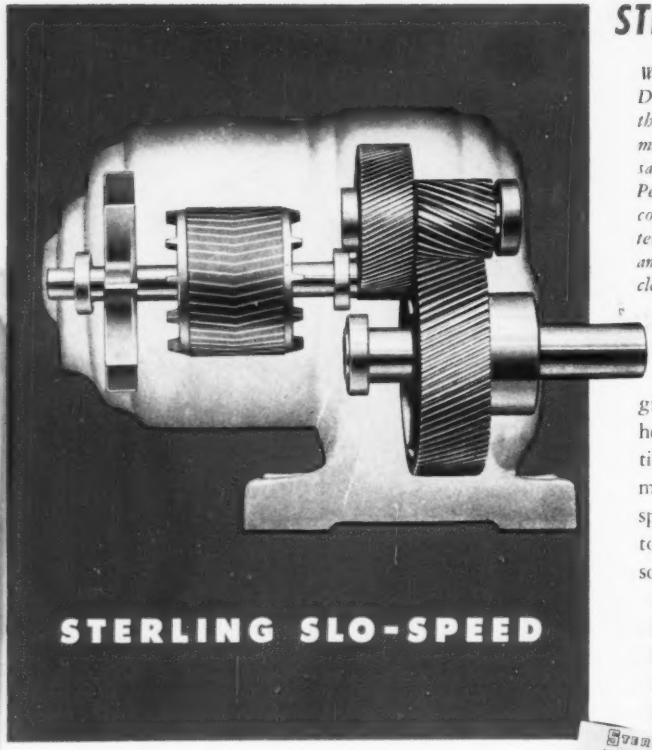
PROCESSING



FE PICTURE-FLOWSHEET NO. 45

PACKAGING

FOR MINIMUM UPKEEP, EASY CLEANING, PACKER CHOOSES



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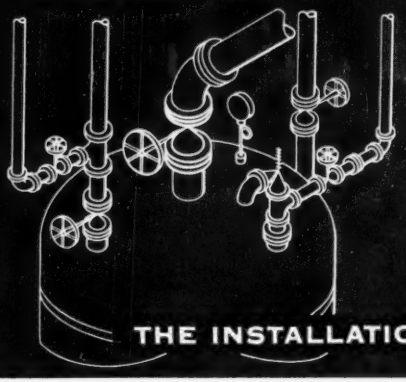

THE INSTALLATION

rane Ni-Resist valves on starch inlet lines to con-
rters, Corn Products Refining Co. plant, Argo, Ill.

THE HISTORY

alves in this service are constantly exposed to hy-
rochloric acid vapors under working pressure of
) psi at approximately 280 deg. F. None of the
alves formerly used lasted more than 2 to 3 weeks
ithout repairs. In 3 to 4 months they had to be
tired from service for rebuilding. Maintenance
sts were excessively high.

To stop the trouble, the plant chose Crane Ni-Resist
lloy Cast Iron Gate Valves with Crane 18-8 Mo
m. Since being installed, these valves have oper-
ed at highest efficiency. On last inspection after 19
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llent condition.

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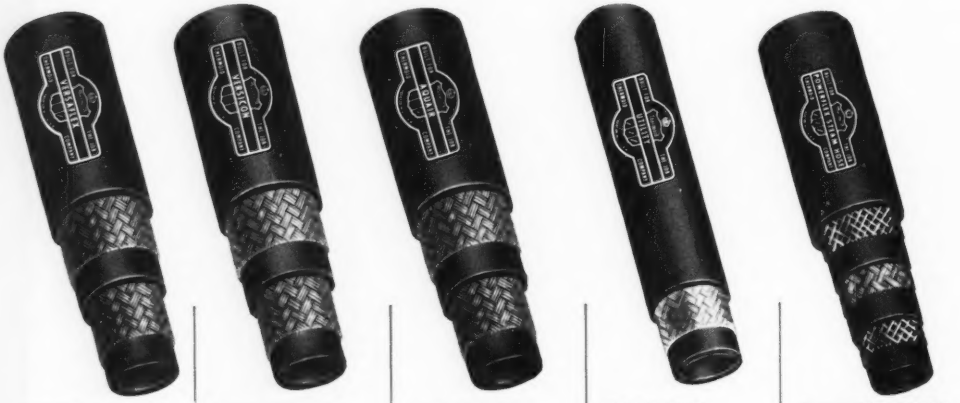

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SANTA CLAUS

Could Die of Old Age

No one shoots Santa Claus. This remark about a government which spends and spends and spends may well be true. But it is also true that Santa Claus is an old man. At his age overwork might well kill him.

It is with the possibility of working Santa Claus to death that this editorial is concerned. No position is taken as between the contending political parties in the present campaign. Our concern is with the problem of protecting Santa Claus.

It is true that as a nation we now enjoy great prosperity. The prosperity is not nearly so general as the political advertisements of it would suggest. Millions of individuals, notably those living on pensions, annuities and other fixed incomes, have been robbed of half their purchasing power by inflation during recent years, and whole industries know little or nothing of boom times.

However, measured by so basic a gauge as unemployment, we do have great prosperity. Less than two million of our total working force of over 64 million are unemployed, and many of them are unemployed only while moving from one job to another. The real income, i.e., what their dollars will buy, of those with jobs is somewhere near its all-time peak.

Our Prosperity is Precarious

The prosperity we enjoy, however, is precarious. This is primarily because it is dependent upon a rising volume of expenditures by the federal government. At present almost a quarter of our entire national income is ladled out through Washington, and in an ever increasing amount.

If, as matters now stand, federal expenditures were to be suddenly and sharply cut, our government-financed prosperity would be severely upset. But if the federal government were to try to keep right on providing prosperity by steadily increasing its expenditures, the end result would be more certainly disastrous. It would be a crash caused primarily by having continuing inflation of prices destroy the value of the dollar.

Higher government expenditures of worthless dollars then could accomplish nothing. Santa Claus would be dead from overwork.

To Provide Firm Foundations

The general route to be followed in putting firm foundations under our prosperity is quite clear. It involves two steps which must be taken closely together. The first is to stop the continuous increase in federal expenditures. The second step is to substitute expanding private business for government-financed business as the principal foundation of expanding prosperity.

The increase in federal expenditures can be stopped without sacrificing any effective measures now directed toward meeting our top priority requirement—protection from armed Communist aggression. The most competent authorities of both major parties agree it can be done by (1) better planning of and the elimination of outright waste in defense arrangements, and (2) cutting those civilian expenditures which cannot be justified at the same time we are undertaking a great new load of defense expenditure.

It is also possible to substitute expanding private business for government-financed business. The problem is primarily that of relieving private business of the staggering load of federal taxation it now is carrying. Federal taxation now takes 52 per cent of all corporate profits and 82 per cent of all so-called excess profits. If it were not for the forced draft placed under our economy by rapidly mounting defense expenditures, this burden would surely lay a disastrous blight on private business expansion. If expanding private business is to have a chance to play its critical role as a subtitute for government-financed business, its taxes must be cut, and soon.

It Won't be Easy

It would be naive to contend that it will be easy to check the expansion of federal expenditures. They have been running wild too long, and in the process contributing to a feverish, inflationary prosperity. Likewise, there is no reason to believe that the easing of the load of business taxes is going to be easy. The basic blight it puts on business expansion has been too long obscured by having our economy dosed with artificial stimulants, most notably enormous injections of federal expenditures.

The Key Question—How Long?

It is obvious that prosperity is going to be a major topic of discussion in the present political campaign. There is nothing the matter with that. Prosperity is a key concern of the voters in choosing a national administration.

To make the discussion of prosperity really useful, however, it is important to ask and get answers to the right questions about it. The key question is not whether or not we have prosperity. That we have it in large measure is generally conceded.

The key question is, "How long can we continue to have prosperity?" The answer—not very long if we continue to rely primarily on new injections of inflationary federal expenditures. Santa Claus, be it remembered, is no youngster. If we continue our present improvident course, he will be worked to death. Those politicians, regardless of party, who see this clear danger and who have plans to escape it are facing up to the crucial question about our prosperity.

McGraw-Hill Publishing Company, Inc.

TRUCK with 1,800 gal. tank picking up milk from Maryland farm for delivery to Washington plant.

Milk Tank Trucks Are Banishing the Can

Old system seen "going out," since bulk method gives processor better quality milk, cuts receiving room labor and equipment, and reduces handling costs

ARTHUR V. GEMMILL
Associate Editor, "Food Engineering"

Is that traditional item of dairy equipment—the milk can—headed for oblivion?

Probably not immediately.

But from the gains that are being made by many dairies now bulk handling milk, importance of the can as a means of transporting this product from farm to processing plant is definitely on the wane.

Started primarily as an aid to quality improvement, bulk handling has demonstrated many possible benefits to both processor and producer.

For the processor it has—

1. Reduced hauling costs

2. Cut plant receiving room labor and equipment

3. Lessened refrigeration requirements at the plant

4. Eliminated disputes with producers over weights and fat tests

5. Reduced bacterial counts and improved flavor of the milk, and

6. Eliminated contamination arising from improper use of milk cans.

Producers have benefitted too—by more accurate weights of their milk than is possible with cans, elimination of fat losses due to "stickage" to necks of cans, and reduced labor in handling and cooling the milk.

Two Basic Units Involved

Main components of the bulk handling system are refrigerated farm tanks into which the milk is transferred immediately after it is drawn from the cows, and insulated tank trucks used to transport milk from farms to processing plants.

A number of different types of tanks are employed on the farms. The following are the most important of these:

Plain, insulated tanks without means of refrigeration. Milk is cooled by flowing over a surface cooler and is held in the tank until picked up. These are used primarily in California, where herds on "ranches" are large.

A tank similar to the above with a small direct-expansion surface cooler suspended in it.

Cold wall tanks in which the refrigerant circulates through a flooded plate or tubes welded to the stainless steel sides.

Converted can coolers. In these, milk in the storage tanks is cooled by an ice-cold waterfall that runs down the sides of the tanks. They provide cooling from 90-50 deg. F. in less than an hour. An added advantage to these units is the separate tanks for morning and night milk.

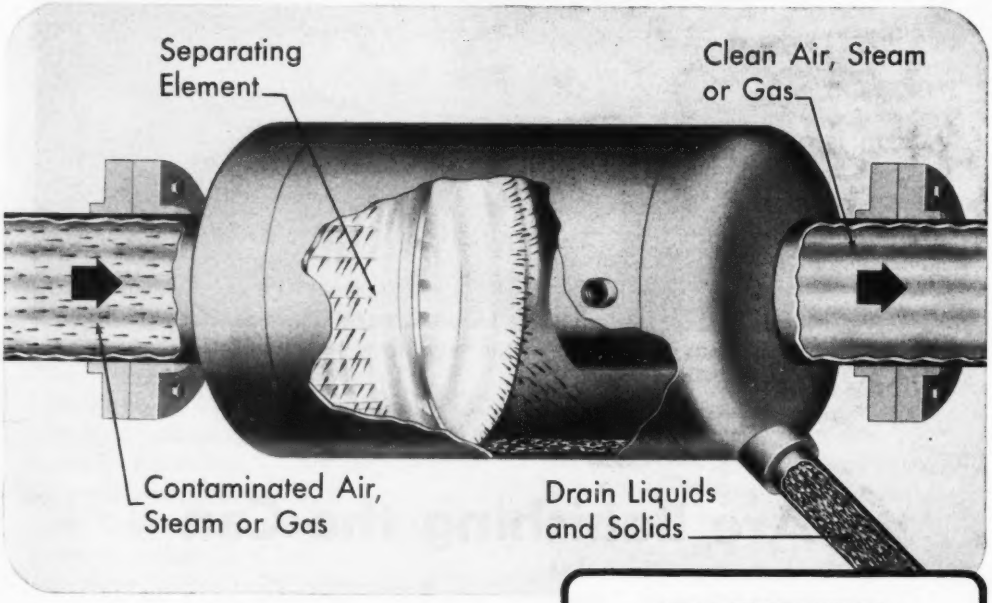
All tanks are of stainless steel and equipped with large, slow-rotating agitators that thoroughly mix the milk without creating foam. Newer installations are almost exclusively of the cold-wall type, refrigerated by Freon, and equipped with thermostatic controls that insure retention of below-40-deg. temperature. Sizes range from 30 to 600 gal.

When purchasing a tank, consideration should be given to: Present production; possibilities of future expansion; chances for a change to every-other-day pickup, and emergencies. It is therefore recommended that the tank should be of sufficient size to hold at least three milkings.

In most cases, they are purchased by the farmers. This represents an

How Hi-eF *Purifiers end* GUCK

Problems in Steam, Air, Gas and Vapor Lines



● Here's the easy, practical way to end costly guck problems in pipelines. The illustration above shows how Hi-eF Purifiers separate, collect and eject pipeline guck, rust, sludge, oil, line scale and other objectionable entrainment such as moisture, condensate and solids from pipelines. Not only will Hi-eF purifiers prolong the life of your pipeline equipment, reduce maintenance, but they also make valuable contributions to higher production schedules and purer, cleaner products, in many industrial applications.

Hi-eF Purifiers save you money without retarding or stopping flow. In fact, the greater the velocity through a pipeline, the greater their efficiency. And although much more efficient, they cost no more than ordinary separators. It's another result of Anderson's reliable research, expert engineering, and cost-cutting mass production. *Every steam, vapor, gas and air pipeline needs a purifier.* Learn how one can save your plant money. Write for Bulletin 500 today.

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7 WAYS

Hi-eF Purifiers Save Money

1 By cleaning steam from boilers, they protect reciprocating engines, turbines, super-heater tubes and other equipment.

2 In exhaust steam and vapor applications remove damaging oil and acids which attack surfaces when vented to the air.

3 Reclaim valuable solids in gases and vapors arising from materials during evaporator operation.

4 Increase life and reduce maintenance on air tools by removing abrasive materials from air.

5 Keep water and dirt out of spray painting equipment thereby protecting finish of products.

6 Protect steam ejectors, valves and other expensive pipeline equipment.

7 Remove moisture, oil, etc. from gas lines between and after compressor stages.

investment of approximately $1,500 for a 100-gal. installation (completely equipped with refrigeration compressor and thermostatic controls,) and $2,500 for a 200-gal. one.

These are factors that tend to offset this investment: No additional cooling equipment is required (without the bulk tank, can coolers would be needed). There are savings in butterfat and weight, estimated at 8¢ per cwt. Also depreciation on cans is eliminated, estimated at 2¢ per cwt. And hauling costs are decreased.

Tanks are installed in the milk houses at the farms. Milk is either piped from milking machines to the tank, or poured directly from pails. It is cooled quickly to approximately 38 deg. F.—usually in 20-45 min. Segregation of morning and night milk has not been found necessary, due to the quick cooling and thorough agitation in these tanks.

Tank Trucks

Transportation from farm to processing plants is by large (1,000-3,500 gal.) stainless steel tank-trucks of standard design. In a stainless steel compartment on the rear of the chassis are mounted a small sanitary pump for moving the milk from farm tank to truck, and a tray, or cabinet, for storing composite sample bottles (one for each producer on the route).

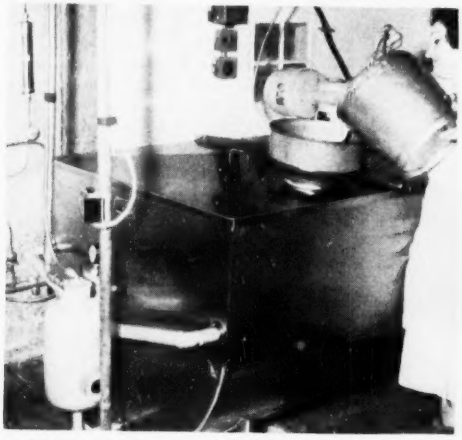
Samples are usually ice refrigerated to prevent deterioration. Provision is also made for protection of the hose or plastic tube used to transfer milk from tank to pump.

When the truck arrives at the processing plant, a hose is connected to an unloading pump and the milk is transferred directly to storage tanks. Or it can be pumped to a clarifier and to processing.

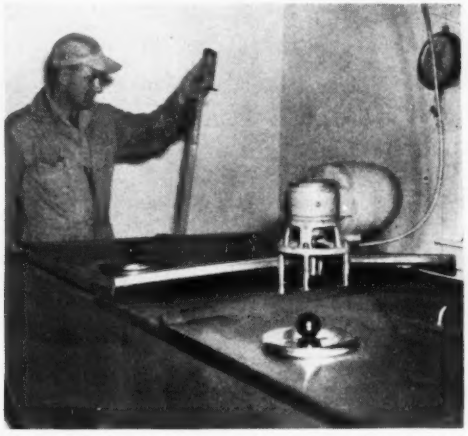
This method of handling at the plant has eliminated the need for can

(*Turn to page* 213)

How It's Handled on the Farm



AS SOON as milk is drawn from the cows, it is poured into cold wall tank which quickly cools it to 38 deg. F.



TRUCK DRIVER determines volume of milk in tank. Each tank is carefully calibrated after it is installed.

MILK is transferred to tanker by means of plastic tubing and constant volume pump (some companies use rubber hose and centrifugal pumps). Note trays above pump in which composite samples may be carried.

SPECIAL CAP is used to seal end of tubing to prevent contamination during handling and transporting to next farm. Then tubing is rolled into coil and placed beside pump in dustproof compartment.

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Your coconut-flavored products enjoy the sweetness and freshness of a newly opened coconut itself when you fortify them with Coconut Flavor by Firmenich. For Firmenich has captured this delicious flavor . . . reconstructed it for you by original research . . . prepared it for you as a precise and potent flavor material . . . of the utmost purity and stability . . . to enhance the appeal of your cake mixes, ice-cream, candy, all the foods and confections that you flavor with coconut.

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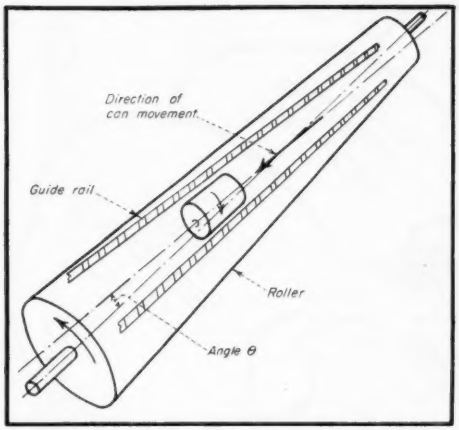
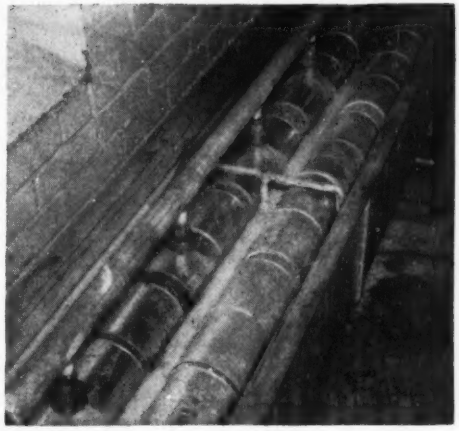
Novel principle . . .



PHYSICS behind idea: Guide rails hold axis of can at slight angle to axis of roller. Thus can moves forward when rotation is imparted to it by turning roller.

. . . and its application



TWO-ROLLER UNIT employed in processing canned peaches at Clemson. Rotating, forward-moving cans are seen going under water sprays in cooling section.

Can-on-Pipe Gave Them a Hunch. Result—

New High-Speed Cooker-Cooler

Put to work in plant equipment, superintendents' practical conception proves worth in processing of canned citrus juice and peaches. And it's seen suitable for preparing many other acid-fruit products.

L. O. VAN BLARICOM
Associate Food Technologist, South Carolina Agricultural Experiment Station, Clemson, S. C.

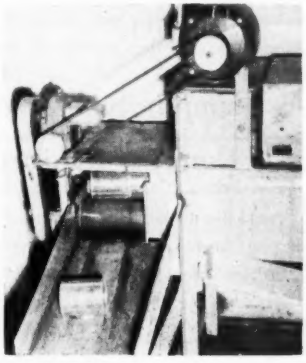
Rapid heating and cooling of canned products—in a continuous operation—are provided by an ingenious new heat-exchanger unit.

Performance of the radically designed equipment has already been demonstrated on a major citrus-juice run and also in peach canning. Simply made and versatile in operation, it is seen useful for cooking and cooling many acid-fruit products.

Moreover, organoleptic tests of canned peaches thus processed have indicated resulting flavor is no different, texture somewhat firmer.

The new method was conceived when G. A. Chissom and A. W. Gordon, production and maintenance superintendents, respectively, of Ploeger-Abbott Co., Leesburg, Fla., noted that a can, when held at a slight angle by guide rods on the top of a rotating pipe, would travel along the pipe.

This observation led to the designing, building, and testing of a unit on which, in a recent season, the company cooled 450,000 cans of citrus juice from 195-200 deg. F. down to 100 deg. F. in a mere 1 min. period.



DISCHARGE end of the Clemson unit.

The cooler was constructed as follows: Standard steel pipe of 5 in. dia. was suspended horizontally in water, in such a manner that it could be rotated. Guide rails were then formed of welding rods and fitted in to hold cans on top of the pipe at a small acute angle (see drawing) between the can axis and the axis of the pipe.

For capacity, four such pipe rollers were incorporated in the unit.

As cans were rotated by the pipe, they were at the same time moved forward. Speed of this movement of the cans depended, it was learned, on both the rpm. of the roller pipe and the acuteness of the angle between the axes. Of course, the rpm. of the cans depended entirely on the turning speed of the roller pipe.

Applied to Peach Canning

In an effort to obtain an improved canned product, South Carolina Agricultural Experiment Station used this type machine for both cooking and

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cooling of freestone variety peaches.

For this purpose, an experimental 24 ft.-long cooker-cooler was fabricated at the Horticultural Products Laboratory, Clemson, S. C., in the spring of 1951. It employed two rollers made of standard 4 in. (4½ in. o.d.) steel pipe. And of the machine's length, 10 ft. was used for heating with atmospheric steam, and 10 ft. for spray cooling.

To determine the suitability of this type unit, freestone Halehaven peaches were heated in it for different periods ranging up to 20 min., while rotation of cans was varied at speeds ranging up to 280 rpm.

For each determination of center temperature during cooking, eight cans were placed end-to-end on the roller pipe. Since variations might arise due to heat absorption through the ends of the containers, first and last cans were not included in the calculations. Thus temperature figures were based on the averages of the other six cans.

By injecting live steam from open pipe into the cooker section, temperature was maintained at 205 deg. F.

This was the procedure: Twenty-one ounces of peach halves were filled into No. 2 cans (401 by 411), then covered with 40 deg. Brix syrup, after which cans were exhausted for 4 min., then immediately run into the new unit. At the end of the exhaust period, the temperature was 117 deg. F.

What Tests Showed

Results of the experiments are depicted in Chart 1, where the data have been plotted as curves to indicate the relationships of variations of cooking times and can-turning speeds. Since curve graphing of all data of the tests gave a clutter of lines, only the curves for 24, 98, and 280 rpm. can-turning speeds are shown here, with the 0 rpm. (no movement) curve included as the basic reference line.

It should be noted that the center temperature of all the cans rotated during the cooking period, including those turned at the slowest speed plotted of 24 rpm., climbed rapidly to 180 deg. F. or above in the first 4-5 min. Furthermore, as the 10 min. cook period was approached, the curves tended to merge near 200 deg. F.

These results indicate that 98 rpm. is approximately the optimum speed of rotation to obtain the highest center temperature in the shortest period of time.

Curves in Chart 2 were plotted to show the center temperature obtained with a 4-min. cook at various speeds of can rotation. Result of this series of experiments again indicate that the optimum speed of rotation, is around the 100-rpm mark.

A salient fact which may be concluded from both sets of curves is that with any speed of can rotation, even the slowest, there is a rapid increase in heat penetration, as compared to heat absorbed in cans which are not rotated.

During the summer of 1951, approximately 5,000 cases of 24-2½ cans of peaches were processed on the experimental cooker-cooler at Clemson. Employed was a 5-min. period for cooking, followed immediately by a 5-min. period of cooling under water sprays. A uniform speed of can rotation of 150 rpm. was maintained throughout the experimental runs.

Due to the rotation in the 10 min. period during cooking and cooling, a slight turbidity developed in the syrup. But this was now considered serious.

To test quality of the product, a taste panel of 25 male students sampled and scored peaches processed by the new spinner cooker-cooler in comparison with fruit prepared by the conventional method in a water bath for 25 min., and no difference in flavor was indicated. However, peaches processed by the experimental unit had a firmer texture.

Design Calculations

A word now on computations considered in the design of the equipment:

Concerned here are roller size and length, speed of its rotation, time of cook, and the angle between can and roller axes. And the symbols are as follows:

L . . . . . Roller length, feet
T . . . . . Time, minutes
D . . . . . Diameter of roller, feet
d . . . . . Diameter of can, feet
Θ . . Acute angle between can and roller axes
$RPMr$ . . . . . Rpm of roller
$RPMc$ . . . . . Rpm of can

Employing these symbols, the equation—

$$L = Sin\ \Theta\ (RPMr \times \pi\ D \times T)$$

. . . gives all the information needed except the rpm. of the can. This latter, however, may be expressed simply as—

$$RPMc = \frac{D}{d} \times RPMr$$

A patent application has been made by Chissom and Gordon for the principles involved in this new equipment, and patent rights are now held by Chisholm-Ryder Co. of Niagara Falls, N. Y.

The above article is designated as Technical Contribution No. 201 of the South Carolina Agricultural Experiment Station, Clemson, S. C.

PERFORMANCE TRACED: Optimum can rotation approximates 100 rpm.

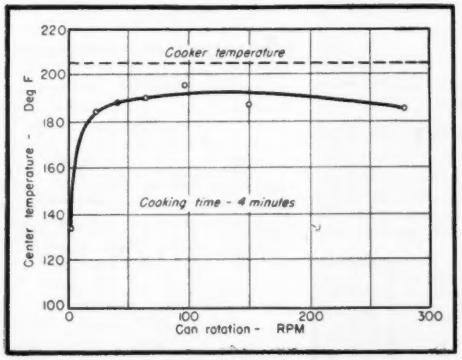

CHART 1—Center temperatures obtained in No. 2½ cans of Halehaven peaches at various can-rotation speeds.

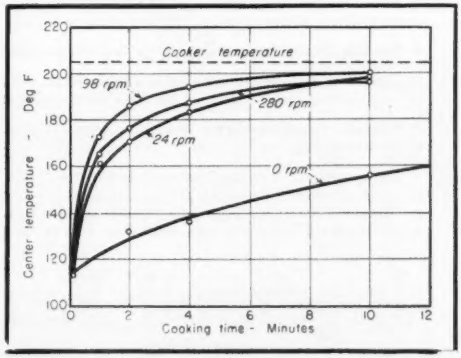

CHART 2—Can center temperatures recorded at end of 4-min. cook with different speeds of can rotation.

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DMV and DHV PUMPS
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✔ Double Mechanical Shaft Seals
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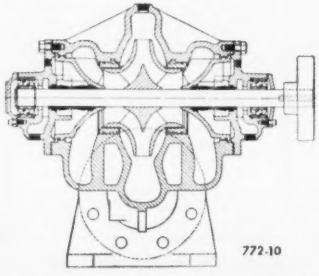

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MICROPHONE IN HAND, chief dispatcher checks truck locations by means of grove-map and numbered disks on board, then routes trips as expedient.

TRUCK DRIVER gets dispatcher's instructions by two-way radio.

Hauling Costs Cut 3 Ways

Citrus juice processor (1) selects fleet units keyed to loads, (2) provides most effective means of unloading, and (3) uses 2-way radio for swift, efficient control enabling transport of more fruit with fewer vehicles

THREE MAJOR MOVES are credited for the success of Clinton Foods, Inc. Juice Industries Division, in lowering the costs of transporting 160,000 bu. of citrus fruit per day from 7,500 acres of scattered groves to the company's three Florida juice plants—Dunedin, Auburndale, and Frostproof.

The first, resulting from years of practical experience, was selection of the types of tractor and trailer most economical for the hauls. Second was determination, by trial and error, of the speediest and safest methods of emptying trailers at plants. And third was installation of two-way radio for most efficient dispatch and control of the carrier fleet.

Citrus fruit is hauled in bulk, therefore choice of maximum-payload trailer was economically important. Selected were Great Danes and Kinghams, 89 with tandem axles, 36 with single axle, all company owned, as well as the 54 Mack tractors that haul them. Another 60 to 70 tractor and semi-trailer units are available on a rental basis to meet peak-day demands.

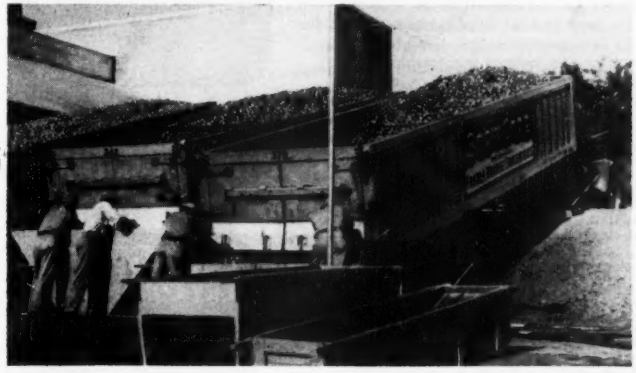
Ratio of trailers to tractors, including leased or hired equipment, is approximately 3 to 1, for the reason that generally one of three trailers is at the plant, one at the groves, one in transit.

Requiring consideration, too, were the Florida State highway laws, which limit overall vehicle length to 50 ft. and gross vehicle weight to 64,000 lb. With the combined weight of tractor and semi-trailer at 23,000 lb., the maximum payload of the tandem axle trailer unit is 64,000 lb. less 23,000 lb., or 41,000 lb. (20½ tons).

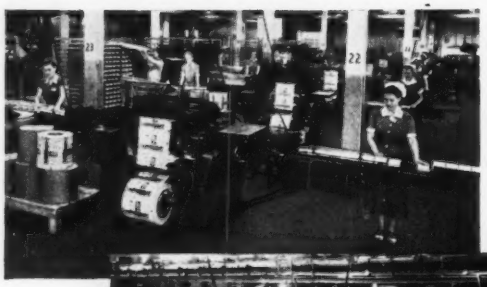
Extra Payload

Structural members of trailers are fabricated from high tensile strength steel, with front and side panels of welded (instead of riveted) construc-

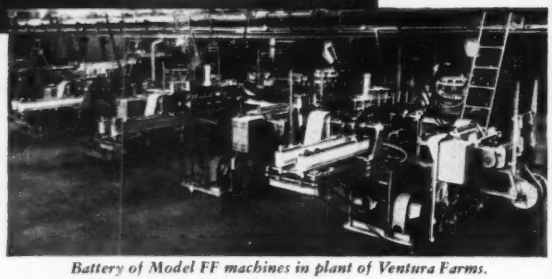
Earthen Ramp Dumping



TRAILERS are hauled up earthen embankment, wheels are chocked, and contents emptied by gravity through tail-gate openings.



Battery of Model FF machines in plant of Seabrook Farms.



Battery of Model FF machines in plant of Ventura Farms.

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The Model FF fits in perfectly with any production layout, and because it is virtually a single unit, it can be transported from one plant to another, if desired.

For utmost efficiency in wrapping, get the facts on the dependable Model FF.

We can deliver FF machines in time for this season's pack

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tion to provide smooth inside surfaces that can be easily cleaned and that do not damage the fruit.

Since the Great Dane trailer is not equipped with body hoist for dumping, an extra ton of payload may be carried in it (weight saved by omission of the mechanism). However, to take advantage of the extra ton-a-trip load, special provisions were necessary for emptying these trailers.

Two methods of unloading are employed at the Clinton plants:

At Dunedin and at Frostproof, earthen ramps, equal to the length of the trailers, were constructed. Conveyors for carrying fruit to storage were installed at the bottom of the ramps. Tractors pull trailers across portable bridges over conveyors and up the inclines. Then, when in dumping position, trailers and tractors are chocked for safety. When trailer is secure, the tail-gate is opened wide enough for rapid, controlled flow of fruit to the conveyor.

At Auburndale, on the other hand, trailer and tractor are backed onto runways hinged near the side of the conveyor which delivers fruit to storage. When in position for dumping, the entire tractor-trailer assembly is tilted by hydraulic lift to permit gravity flow of fruit from the tailgate.

Clinton finds both methods have their good points, but preference is now being expressed by plant operators for the earthen ramp on the score of speed and efficiency.

Fleet Controlled by Radio

Two-way radio hooks all tractors with the plant stations—one at Auburndale and one at Dunedin—that direct movements of the fleet between groves and plants. The chief dispatcher (seen in first photo) is centrally located at Auburndale, (from this point, Dunedin lies some 65 mi. to the west and Frostproof about 30 mi. to the southeast). During the season, he has his skilled staff on duty 24 hr. a day.

Performance of this control system, installed at a cost approximating $30,000, is said by the company to have fully justified both initial and subsequent operating expenses. It has now been in use nearly two years.

Destination of loads can now be "quickly shifted over the air" to any one of the three plants most in need of fruit supply. Also, a load of a specific variety of fruit with a sugar-acid ratio needed to maintain quality control of juice can be rushed to any plant where the supply of that type is low.

Furthermore, breakdowns and delays can be reported promptly. And operators and crews can be contacted

Hydraulic-Lift Dumping

TRACTOR AND TRAILER are backed onto steel-beam runways, front ends of which are then hydraulically lifted to empty fruit via tail-gate.

on the job at grove locations where phone facilities are not handy.

Thus, the number of "dead" hauls have diminished and the percent of "live" ones increased—in short, more fruit is carried with fewer vehicles.

Radio control is credited with reducing fruit hauling costs, maintaining production at top level, and aiding in the control of product quality.

Mechanical Refrigeration on Rails

—*Continued from page 85*

picked up "by the roadside," hence high portability is desirable so the whole unit can be speedily replaced.

Remarkably Compact

Ultimately designed for the job was a remarkably compact, self-contained gasoline motor-driven compressor, integrated with a condenser, radiator, evaporator, blower and controls—all in package form measuring 4 ft. each way and weighing 1,100 lb. Two such units are designed for a "slide-drawer" type of installation at one end of the car, in the space normally occupied by a single ice bunker.

While one unit is capable of refrigerating a car, this basic dual design offers a desirable stand-by feature for rail transit. And if necessary, the stand-by unit can be set up to cut in automatically for supplementing the other in times of heavy load.

To effect the slide-drawer mounting, a rubber cushioned base was designed for the package, with telescoping rails and rollers permitting it to be rolled in and out from its insulated compartment by means of a hand crank at the end of the car. Two quick-disconnect lines for fuel and automatic controls are the only other attachments. It's possible to remove a unit completely and install a replacement inside 15 min.

To test system sturdiness as well as the mounting — which is merely clamped at the cushioned base and exhaust hood at the top of the unit—a series of wrecking-impact tests were made at speeds up to 11 mph. And while the car end actually buckled in some cases, the unit stood up.

Fuel for the system is carried in two 160-gal. tanks slung under the car. These are capable of supplying three to four weeks' operation at 35 deg. F. when outside conditions are in the summer 80's.

Batteries for each unit are housed in covered boxes at each side of the car and are kept charged by a generator in the unit.

An insulated bulkhead separates the system compartment from the car load area. Cold air is blown from the unit out under the floor racks and up through sidewall ducts in the walls and doors to pass over the cargo. It returns to the cooling evaporator through a grille in the upper part of the bulkhead.

Closeup of Unit

All components of the refrigerating system were especially designed for the job, with weight and space saving main objectives. The compressor is a 6-cylinder, V-type, constructed mainly of aluminum, direct-con-

"...get the Valve Seal A."

Plug valves operate easier, stay cleaner longer, when pressure-lubricated with Dow Corning Valve Seal A. Nonmelting at temperatures as high as 500° F., this silicone lubricant is highly resistant to oxidation, moisture, and a wide variety of chemicals and gases. Noncorrosive to metals, without swelling effect on rubber or plastics, Valve Seal A is also physiologically inert. Its vapor pressure is low, even at elevated temperatures.

Valve Seal's versatility helps solve the problem of stocking large numbers of special purpose lubricants, too. Its stability pays off in reduced cleaning schedules, increased valve life and uninterrupted production. Its lack of toxicity is important in food processing lines.

In plug valves, automatic control valves, flow meter bearings, ceramic plug cocks and in pump packings—wherever conventional lubricants are limited by extreme temperatures, corrosive chemicals or steam—specify Valve Seal A.

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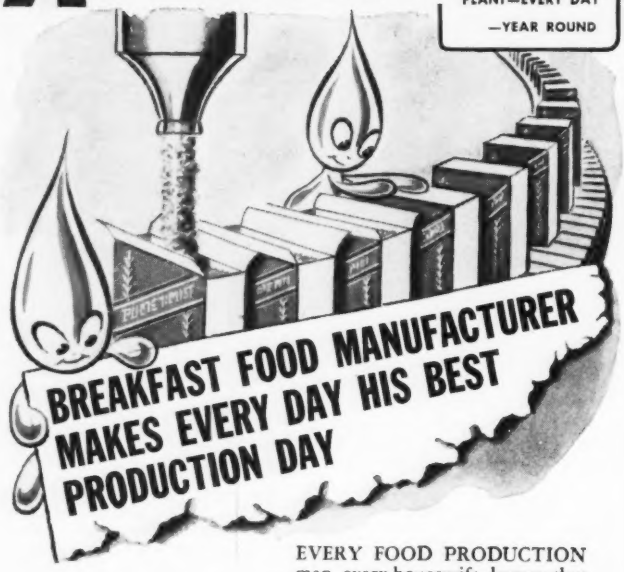

BREAKFAST FOOD MANUFACTURER MAKES EVERY DAY HIS BEST PRODUCTION DAY

EVERY FOOD PRODUCTION man, every housewife, knows that damp weather tends to make sugar sticky. Breakfast food manufacturers know it too.

One of them wanted to produce a cereal coated with sugar. The production line was continually winding up with "popcorn balls" when the sugar-coated grains stuck together in an uncontrolled humidity atmosphere. But Kathabar licked this problem by controlling processing room humidity. Today, this prominent breakfast food manufacturer finds Kathabar humidity conditioning indispensable to sorting, grading, sugar-coating, and packaging of its sugar-coated product.

To *profit-minded food executives:* Kathabar Humidity Conditioners permit *continuous* operation; eliminate weather problems; cut rejects; help prevent production line starts and stops.

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FE-9

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nected by means of a flexible coupling and splined shaft to a liquid-cooled, 4-cylinder automotive-type engine. Freon is used as the refrigerant.

In order to "double" as a heating agent when outside temperatures are lower than the desired car value, the system can be made to provide warmth by throwing a switch which permits high pressure gas to go directly to the evaporator so that automatically controlled warm air is blown into the carrier.

Actually, the packaged refrigeration-heating unit is itself divided by a bulkhead into two compartments. The outside section, with engine radiator exposed behind a protecting grille and automatic control dials below, also houses the engine, compressor, condenser, and two liquid receivers. The other section, fed by the high-pressure liquid line, contains a dehydrator cylinder to absorb moisture, a thermostatic expansion valve, and finned-tube evaporator blower combination.

Starter system components, protective devices, and automatic controls are all carefully integrated to meet the special "non-supervised" aspects of the service.

A failure-proof starting system employs a direct current starter-generator mounted on the engine crankshaft—its field remaining stationary when the engine is operating. Two bimetallic switches, mounted in the engine water jacket, protect it from over-heating. One stops the engine at 205 deg. F. and restarts it at 185 deg. F. The other causes the engine to start whenever its water jacket temperature drops to 10 deg. F. and runs it until 100 deg. F.—thus preventing "hard starting" during cold weather operation.

A thermostat—with bulb mounted in the airstream flowing to the evaporator—maintains car temperature by cutting the compressor in and out over an adjustable temperature differential.

A thermostatic expansion valve, operating between the high and low-pressure sides of the system, controls flow through action of a diaphragm-operated needle. Both Freon pressure in the evaporator and temperature in the suction line control this diaphragm in opposed action—thus the flow of refrigerant to the coil is maintained at a set temperature difference regardless of the load.

There is automatic defrosting every 5 hr., accomplished by the opening of a solenoid valve which permits high pressure gas to by-pass the condenser and run to the evaporator to melt the frost from its coil surface. This valve also opens when the en-

gine is on the heating cycle and is energized when the engine is cranking in order to ease the starting load.

Another unique feature is the patented suction pressure regulating valve which prevents overload of the engine at high temperature operation and also eases pressure in the system during starting. Whenever the engine runs at less than 80 percent of its governed speed, a solenoid valve closes — through action of a snap switch on the governor arm—and suction pressure is throttled by the regulating valve.

Thus, this overriding suction pressure regulating valve allows compressor operation at the high speed necessary for low temperature work without sacrificing capacity at high temperature operation.

Results of Test Run

All of the above carefully thought-out safeguards and efficiency boosters added up to a perfect performance in the initial trip of the first commercially loaded Morrell car in late May.

Starting out with a full load of meat from Sioux Falls on the morning of May 21, the temperature at the bottom of the cargo was 33 deg. F. with 34 deg. F. at the top.

Then, while it was traveling through Iowa, Illinois, Tennessee, Georgia, and into Florida on May 26, the load was tested every few hours, and at no time did its temperature vary over 1½ deg. from the original temperatures —and this despite a rapidly climbing outside temperature (reaching 90 in Florida).

During the trip, a special vibration-resistant recording thermometer provided a continuous record of temperature (bulb mounted on a sidewall of the car), verifying that steady conditions were maintained.

At Ft. Pierce, Fla., the car was partially unloaded, which brought car bottom temperature up to 48 deg. F. and the top to 65 deg. F. However, when the doors were closed and the unit operated for 20 min., the original low temperatures were restored.

Final unloading occurred a day later in Miami, where great surprise was registered at the fresh appearance of the cargo—some viewers claiming "it must have come from a local packing house".

During the whole trip, which took 137 hr., only 60 gal. of high test gasoline were consumed by the mechanical system, and an operation recorder showed that one unit operated only 39 hr. of the time, while the second was only cut-in for 11 hr.

In this particular southern run it was found advisable to place the two refrigeration units in tandem, rather than have one on stand-by service. Thus, the primary unit which ran 39 hr. was set to operate on a 3-deg. differential and its partner on a 2 deg. differential. So the latter thus automatically cut in to supplement the service whenever air temperature started to drift upward.

With this tandem arrangement, it was also possible to quickly pre-cool the car and thus reduce temperature of a load while in transit. Such rapid temperature reduction helped to retain moisture in the product.

Central Service

Under an agreement with Thermo-King Railway Corp., Morrell will pay for the use of its 25 new cars on an elapsed-time basis. All maintenance work will be handled by a single refrigeration engineer at Sioux Falls.

The new cars all employ semi-cold-wall construction. They have side-

Preview List of Coming FE Articles

Special features emphasizing the "what, why, and how to do it" are scheduled for early issues of FE—all "engineered" to help you produce higher quality foods at lower costs. These are just a few of them—

Quick Method for Measuring Oxygen in Sealed Packages
Engineering Data on Advanced Freezing Operation
What You Should Know About Screen Mesh
How Shelf-Life of Candies Can Be Extended
New Continuous Lard-Making Process
Manufacture of High-Quality Swiss Cheese
Making Macaroons Continuously
Supervisors Just Dial "80"—And Get All the Facts
Unshelled Peanuts Now Salted by New Process
How 1-Building Efficiency Cured Old 5-Building Squeeze

Put the
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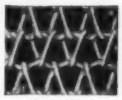
On Freezing Costs
with a
CAMBRIDGE
WOVEN WIRE
CONVEYOR BELT

Whether you're freezing vegetables, meats or fruit products . . . in bulk or I. Q. F. . . . there's a Cambridge woven wire conveyor belt to help you cut freezing costs by combining movement with processing all along your production line.

For example, this photo shows a specially designed Cambridge belt carrying asparagus spears from a wash tank prior to freezing. Other belts may be used on inspection tables, in blanchers, on packaging and labeling machines, in freezer tunnels.

The moving belt eliminates manual handling, helps maintain product uniformity. All-metal construction gives longer belt life and lower maintenance costs. Open mesh of the belt provides free drainage of wash waters as well as free circulation of air in the freezing tunnel. Special side or surface attachments are available to meet individual requirements.



Cambridge Balanced Weave

Cambridge belts can be woven to any mesh or weave, from any metal or alloy, including stainless steel. Next time you have a conveyor belt problem, call in your Cambridge field engineer for his experienced advice. Write direct or look under "Belting-Mechanical" in your classified telephone directory.

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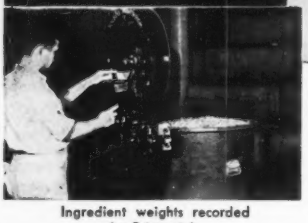

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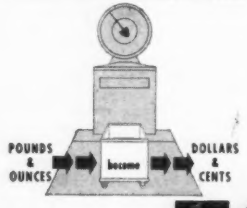
On your scale MATERIAL becomes MONEY



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HEADQUARTERS FOR SCALES

wall ducts about 1 ft. under the ceiling, and the return air is drawn over the load and back to the compressor. They were built by the Mather Stock Car Co. of Chicago.

While the capital investment involved in supplementing a vast number of conventional ice bunker cars with mechanical units appears formidable, some very real savings are seen spurring such a changeover. Normal cost of icing a car with four tons of ice runs to about $25 in the summer months, whereas fuel costs for equivalent mechanical refrigeration is only about $3.

Further, since the mechanical system occupies the space of only one bunker, 16 percent more cargo can be shipped in the same car area.

End (Resume reading on page 86)

Every Part of Fruit Used

—*Continued from page 116*

The oil-bearing juice is pumped from reel hoppers to a tank that feeds the bank of 23 separators comprising the 1st Pass. Centrifuges operate at 15,000 rpm. and each is fed approximately 100 gph.

A measured amount of juice discharged from the separators is pumped to the juice still, where oil is distilled from it. This oil, like that from the peel stills, is caught in drums and later centrifuged to remove residual condensate. Juice from the separators is then cooled and pumped to measuring tanks that supply the citric acid department. The undistilled juice is pumped direct to the measuring tanks, bypassing the still.

A division of juice resulting from the 1st Pass is necessary, even though some oil still remains in that portion not distilled. The temperature in the still inactivates the pectinase and pectase enzymes that clarify the juice. These enzymes provide a necessary reaction that occurs during the juice fermenting period before the juice is pumped to the citric acid process.

Emulsified oil from the 1st Pass is pumped to the feed tank supplying the three 2nd Breakdown separators. These remove water, microscopic pulp solids, some gums and waxes. The raw oil is pumped to another feed tank that supplies the 3rd Pass. Here, it is valved to two centrifuges at the rate of 10 gph. A small amount of water is added to this feed. The resulting polished oil is caught in drums and stored. Waste from the 2nd Breakdown and 2nd Pass is pumped to storage and later treated for oil recovery.

Quality of the finally packed cold-pressed, U.S.P.-grade oil is greatly en-

hanced by the company's processing for removal of the waxy or stearoptenous constituents which, during storage of the product and in its conversion to flavoring extracts, tend to separate as unsightly sediment.

Although the process is not divulged in detail, it consists in the main of a chilling process, followed by centrifugal removal of the separated waxy constituents and filtration to insure sparkling clarity. The clarified oil is then vacuum deaerated and is ready for blending.

For invariable compliance with pharmacopoeial standards and for enhanced uniformity, the lots of oil, as produced, normally require blending. As a guide for blending, individual six-drum lots of oil are carefully analysed and color and aroma evaluated. Near perfection in the blending operation is attained because of the large volume and the variety of oils available.

Each fruit growing area, and probably each varietal strain, affects the characteristics of the cold pressed type oil obtainable. Only by maintaining adequately large oil stocks, coupled with expert blending, may a uniformly high quality be assured.

Final blends are checked, before packing, by analyses for compliance with U.S.P. standards, and by tests for color, flavoring property bouquet, clarity, freedom from objectionable waxes, etc.

Lemon Juice Processing

In the new juice-processing building, every facility is provided for maintaining a high degree of sanitation, operating efficiency, and to produce a top quality frozen or hot-packed product.

Here, the juice is cooled to 40 deg. F. in heat exchangers and pumped to stainless steel storage and mixing tanks (six unjacketed, ten cold-wall). When required, juice is deaerated in the tanks by application of a 20-25 in. vacuum for 30 min.

Juice from the cold-wall tanks is used for the three frozen products; that from the non-jacketed tanks for the hot-pack juices.

Special equipment for processing the different juice products includes:

A Votator for chilling juices prior to freezing.

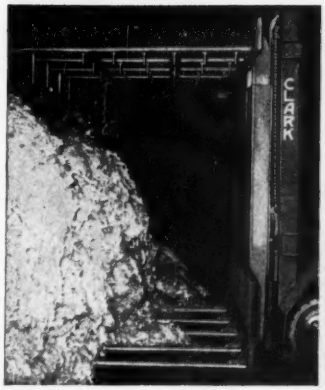
Six canning lines that provide flexibility of can sizes.

A large belt-style freezing tunnel with a rated capacity of 1,200 cans (6-oz.) per minute.

A bulk sugar handling system.

Mojonnier Lo-Temp evaporator, and de-oiler.

FMC rotary can coolers for hot-pack juices.



Quoted from an article* in TEXTILE WORLD by MICHAEL J. KOROSKYS, Ass't Prof., Wool Dept., Lowell Textile Institute

BALES

BODIES

BOTTLES

ROLLS

TIRES

HOW CLARK EQUIPMENT SAVES $400 A WEEK

"The average savings of four large worsted mills that are using this (CLARK) equipment is $400.00 a week. Two men, with the truck and wool-handling device, have replaced an average of 12 men per shift in each plant. In one plant the team did what 14 men used to do . . . and the new method is improving quality as well as reducing cost.

"One mill superintendent summed up the advantages this way—'We have cut costs and are saving manpower . . . better from safety angle, too . . . housekeeping is better . . . we can make better use of floor space . . . we're really sold on this improvement'."

* * * * *

Wherever you go, you hear the very same story:

CLARK EQUIPMENT SAVES MONEY

Yes, worsted mills, steel mills, warehouses, freight houses, piers, truck terminals and countless other production and distribution facilities profit by the use of CLARK EQUIPMENT.

It's a safe bet there's a place in *your* operation where Clark fork-lift trucks, powered hand trucks or industrial towing tractors can show important savings in both time and money. You'll never know until you investigate . . . and it costs nothing to find out. Why not see what Clark Equipment can do for your business . . . today? Call your nearby Clark dealer—he's listed in the Yellow pages of your telephone directory under "Trucks, Industrial"—he will be glad to help you!

In addition to this wool handling device, Clark makes 18 special attachments for lifting, lowering, moving and stacking unusual types of materials, parts and products.

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The freezing tunnel is 85 ft. long by 21 ft. wide by 22 ft. high, insulated with 8 in. of corkboard. There are four tiers of 70x10-ft. galvanized wire belts driven by 1½ hp. motors located outside the freezer.

Eight fans, each powered by a 15 hp. motor, circulate air over two sections of steel-finned refrigerated coils to provide a temperature of −40 deg. F. within the tunnel.

Frozen Juices

Single Strength. Juice is pumped through a Votator for chilling to 30 deg. F., then is canned, quick frozen in the tunnel, cased, palletized, and stored at −10 deg.

Concentrate. Juice is continuously concentrated in the Lo-Temp unit, then drawn off in drums and frozen in the −10 deg. storage. Or it may be chilled, canned, and frozen as above.

Lemonade. Unlike orange, lemon juice is always diluted for beverages. So only a small amount of concentrate (about 10 percent) is added to single strength juice in the preparation of concentrate for lemonade.

The juice mixture is prepared in cold-wall tanks, then sugar is added to attain the desired Brix, followed by chilling, canning, freezing, and storing at −10 deg. F.

Hot-Pack Juices

Single Strength. Juice is pumped through the de-oiler, where its temperature is raised to 176 deg. F., and oil, which could create off-flavors in this process, is removed. This temperature also stabilizes the cloud and pasteurizes the juice. From the de-oiler it goes to any one of the three hot pack canning lines, where the cans are filled and closed. Filled cans are conveyed through FMC rotary coolers and cooled with 35 deg. F. water, then are cased. Finally, cases are palletized and stored at 40 deg. F.

Concentrate for Lemonade. Mixed single strength and concentrated juices are pumped from a non-jacketed tank through the de-oiler, cooled in a heat exchanger to 50 deg. F., then pumped to a tank where sugar is added to bring it to the desired Brix. This syrup is pumped through a heat-exchanger which raises the temperature to 160 deg. F., and it is then filled into cans. Cans are cooled, cased, palletized, and stored at 40 deg. F.

Concentrate. From a non-jacketed tank, juice is pumped through a pasteurizer-cooler heat-exchanger and then to the evaporator, where it is continuously concentrated to the desired ratio. From the evaporator, it goes directly into barrels and into 40 deg. F. storage.

Granulated sugar, used for sweetening juice, is conveyed from the sugar storage bin to a scale, and a measured amount is chuted to a mobile bin that may be moved on a monorail to any one of ten cold-wall mix-tanks. Connected to the base of this bin is a helical screw conveyor driven by a ¾ hp. motor.

Each tank has a paddle-type agitator powered by a 5 hp. motor. The operator adds sugar slowly to the juice so that it may be completely dissolved. After mixing, the tank is closed and a vacuum of 20 in. is applied to finally deaerate it.

End (Resume reading on page 117)

Cures Smokehouse Troubles

—Continued from page 107

which most closely fitted the required pattern, then had the necessary adaptations made. A Sturtevant axial-flow elbow fan was chosen.

This fan delivers large volumes of air against medium pressures and requires only a minimum of space. It is an axial belt-driven fan with an elbow at the entrance side. The elbow feature is a "natural" for the application. It allows the air to rise vertically from the coils, turns it efficiently 90 deg., and discharges it horizontally down the distribution duct. Bearings and belts are out of the air stream and are, therefore, readily available for maintenance and cleaning.

The elbow construction permits relatively high temperatures without additional bearing protection. The housing is not shaped in the same manner as that of the standard centrifugal fan shown in the diagram, and accordingly it will not collect tars. Also, the rotor is accessible for any cleaning or maintenance from within the chamber. And the all-steel construction of the fan also withstands alkali cleaning solutions well.

Cool fresh air is introduced through portions of the process for drying of the product and for humidity control. This is drawn from the room and preheated, as it enters the suction side of the fan, by a small industrial steam coil.

Draft Problem Solved

Any fresh air that is introduced into the processing chamber must have an equivalent amount exhausted to the atmosphere. This exhaust air is smoke laden and at the processing temperature. Therefore, it deposits tars on all surfaces contacted.

In the conventional installations, exhaust fans of the centrifugal or

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WHATEVER your food product — whatever the flavor problem it involves — it is more than probable that our laboratories have done the basic research that will enable us to supply a quick solution to your needs. Meat products, vegetable sauces, canned fish and countless other prepared foods acquire added savor and uniformity through the use of our concentrated spicing compounds and exclusive Viandarome Seasonings. For the utmost in flavor and economy, come to* FRITZSCHE . . . *A FIRST NAME IN FLAVORS SINCE 1871.*

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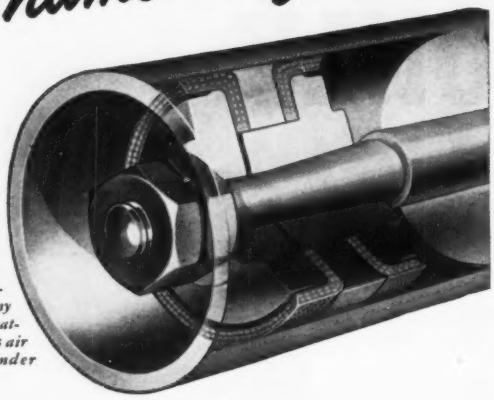

Phantom cutaway showing typical Pumcup-piston assembly—one of many types for all reciprocating pumps as well as air or hydraulic cylinder mechanisms.

Here's how to pump it at lower cost!

IN thousands of plants, Darcova Pumcups are solving the problem of diminishing pump efficiency, repacking, maintenance, down-time, lost production—the things that really eat up dollars in fluid-handling operations! Here's why . . .

1. Darcova composition Pumcups not only increase volumetric efficiency, but they *keep* it high with no appreciable fluid slippage for the entire life of the Pumcups.

2. And, because of their design, composition, and operating principle, Pumcups have *many times the life* of most other types of piston packing.

3. Based on years of application research, Pumcups come in standard and special compositions for exceptional stability in handling almost *any* fluid you can name. For example . . . strong acids and alkalies, food products and even the most troublesome petroleum derivatives.

Big savings? We'll gladly refer you to Pumcup users whose problems are similar to yours. *They'll* tell you! Meanwhile, send for a free bulletin containing helpful, more detailed information: Bulletin 4401 on Pumcups for reciprocating pumps; Bulletin 4502 on Pumcups for air and hydraulic mechanisms. Just write to . . .

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DARCOVA
THE ORIGINAL COMPOSITION CUP

PUMCUPS

propeller-blade types were used. But the exhaust controls and dampers often become inoperative after several months, and processing was regulated by hand. These hand operations often caused trouble because the houses would then be under a slight vacuum, which would draw in room air through the gaskets and joints.

In the new houses, Armour eliminated this source of trouble by maintaining the processing chamber under a slight pressure. This facilitated the use of a natural-draft stack for exhaust. A simplified balanced-damper arrangement was devised to accomplish this result. By this method, the product is in a completely controlled atmosphere at all times.

Maintenance Eased

The existing installations did not have their equipment as accessible as it could have been made by means of access doors. To properly clean the equipment, therefore, mechanics were required, rather than the regular cleanup crews, which further increased costs chargeable to the houses.

It is difficult to measure the efficiency of a smokehouse, for "rejects" in the normal sense of the word do not exist. If any of the products should be under-processed because of fouling of the equipment—with corresponding reduction in temperature or humidity—they are not lost. It is necessary, however, to process them longer, which reduces production and over-processes a portion. As the problem continues and more production is lost, the point will eventually be reached when it is necessary to remove the house from service for cleaning, maintenance, and repairs. Production is lost, of course, during this time.

Every effort was made to overcome this disadvantage. The axial-flow fan is accessible for cleaning from the inside of the chamber, and the belts and bearings are located externally. Also, humidity instruments have now been placed so that they are easily accessible. Because it was difficult to locate heating coils conveniently, special consideration was given in their selection to the ease with which they may be cleaned as well as to their ability to withstand strong alkali cleaning agents.

After the new design was finalized by the Armour engineering department, 16 houses were equipped over the last six years.

The performances of all units has been compared carefully. And the new type of cabinet smokehouse has demonstrated that the undesirable features of the former installations have been eliminated.

End (Resume reading on page 108)

A century of achievement

Studebaker's big, modern South Bend plant symbolizes the century of growth and achievement which have earned for this company an enviable reputation for high quality products and world-wide recognition as America's fourth largest manufacturer of automobiles.

How Standard's lubrication service works for Studebaker

● Look almost anywhere in Studebaker's vast plant at South Bend, Indiana, and you'll see Standard's lubrication service at work.

In one of the many operating departments, the chances are you'll find the Standard lubrication specialist who serves Studebaker. He is assigned to the South Bend area and is close-at-hand to give Studebaker the lubrication engineering assistance they need when they need it.

Almost any day at Studebaker's, you'll see a Standard tank wagon or truck delivering the petroleum products that help keep production rolling. Because these deliveries are made from a nearby Standard warehouse, they are prompt and reliable. Most of the petroleum products used in the Studebaker plant are stocked in this warehouse and are immediately available.

All along Studebaker's assembly and production lines, you'll find Standard Oil products at work. From one of the most complete lines of fuels and lubricants on the market, Studebaker has been able to select the petroleum products that exactly fit its needs.

All of these benefits—expert engineering service, fast and reliable deliveries, a complete line of high quality products—add up to one of the reasons why Studebaker has been a Standard Oil customer for over 50 years. Make Studebaker's experience the basis for putting Standard's lubrication service to work for you. Just phone your local Standard Oil (Ind.) office and ask to have the Standard Oil lubrication specialist in your area call on you.

What's YOUR problem?

Russ Jenkins (left), lubrication specialist from Standard's South Bend office, and Studebaker's Paul Izdepski work closely together to get best results from Standard's fuels and lubricants.

Wherever your plant is situated in the Midwest, there is a Standard lubrication specialist close-at-hand who will work hand-in-hand with you on lubrication problems. Right in your neighborhood, too, you'll find a Standard office and warehouse. It makes immediately available to you a reliable supply of petroleum products. Phone your local Standard office soon, and find how you can profit through Standard's unique industrial lubrication service.

STANOBAR Grease is used throughout the Studebaker plant for lubrication of bearings in electric motors and oil pumps. Its high stability enables it to provide effective lubrication under a wide variety of operating conditions.

STANWAY Industrial Oil. In many of Studebaker's grinding machines, STANWAY Industrial Oil No. 30H answers a special need by serving both as a hydraulic oil and as a lubricant for ways and guides. The high stability necessary in a hydraulic oil and the oiliness needed in a way lubricant are uniquely combined in STANWAY.

STANDARD OIL COMPANY (*Indiana*)

STANDARD

NEW PACKAGES & PRODUCTS

Consumer Packages Boost Sales of Dry Milk Solids

With domestic sales of dry milk solids to home users jumping from 2,400,000 lb. in 1948 to 17,000,000 in 1950, an increase of approximately 183 percent, processors are giving this outlet considerable consideration. Although figures for 1951 are not yet completed, The American Dry Milk Institute, Inc., expects this to become a major market.

Various reasons are given for this upsurge in sales of the consumer-size package. (1) It has been found that this form of milk is gaining consumer acceptance for use within the homes where dietary supplements of the proteins and minerals furnished by milk solids are desired without the fat. (2) In milk-deficit areas it sometimes is difficult to obtain a sufficient supply of fresh fluid milk. (3) For some families economic circumstances make it impossible to purchase adequate quantities of fluid milk for their daily needs. (4) The housewife is learning that in addition to reconstituting the product for a milk drink it can be economically and successfully used in preparation of baked goods and many other foods.

Increase In Brands Noted

A survey of some of the leading retail stores in the Eastern area showed an average of from 5 to 6 brands prominently displayed, some of which are shown in the photo above.

Products shown above are (left to right): "Starlac", The Borden Co., New York City; "Sanalac", Sanna Dairies, Inc., Madison, Wis.; "Smithfield", East Smithfield Farms, Philadelphia; "Alba", Weldon Farm Prod., Inc., New York City; and "Hood", H. P. Hood & Sons, Boston.

The most popular package appears to be the one containing sufficient solids to reconstitute into 3 qt. of fluid milk. These containers generally contain three foil-lined, heat-sealed envelopes, with sufficient quantity in each to make 1 qt. of fluid milk.

In addition to the 3-qt. size, Borden is also marketing a 1-lb. package with the contents in one foil-lined, heat-sealed package which will make 5 qt. of fluid milk.

East Smithfield Farms' package is a 5-qt. size, the contents being packaged in one heat-sealed, polyethylene bag. A narrow plastic strip is enclosed for the consumer to reseal the bag if she does not use all the contents at one time.

Sanna Dairies, Inc., and H. P. Hood & Sons, fortify their products by the addition of 400 units of vitamin D per each 3.5 oz. package.

Ventilated, Contamination-Free Pack for Produce

M. Scafidi Co., Inc., Springfield, Mass., is now prepackaging its "Beauty Brand" fresh tomatoes in a new type, ventilated carton.

This pack, developed by Cello-Masters, Inc., New York City, is said to afford just the right amount of ventilation, at the same time eliminating the possibility of dust, dirt, and insects entering the wrap to contaminate the contents.

Known as "Respiro-Pak", on which a patent is now pending, the film is mechanically vented with tiny, almost invisible "U"-shaped cuts that are in effect "casement windows". These flapped window vents appear in a predetermined pattern to permit a favorable exchange of outside oxygen for inside carbon dioxide gas. However, the small size of the vents and the protective flaps guard against entry of extraneous matter.

Proper ventilation of prepackaged fruits and vegetables has long been recognized as an important factor for longer shelf life, better taste, elimination of odor, and good product appearance. Designed for added protection, it is believed that this pack will find many applications in the fresh product line.

For Package Data Use Reader Service

YOU PROFIT *from Armstrong's*

GLASSMAKING RESEARCH

You profit from Armstrong's research through smoother performance on your lines, stepped up efficiency in your packing operations.

For example, Armstrong's research staff have designed shoulder and base contours which have improved glass distribution and added greater strength. They have improved glass formulations to increase durability and resistance to weathering. Fire polishing and lip finishing techniques have been perfected, giving a safer, surer seal. Close color control assures maximum color uniformity in both flint and amber ware.

These are a few of the ways that Armstrong's research has worked to bring you finer glass. The results are shown both in the performance of your lines and in the appearance of your container. That's how *you* profit from Armstrong's glassmaking research.

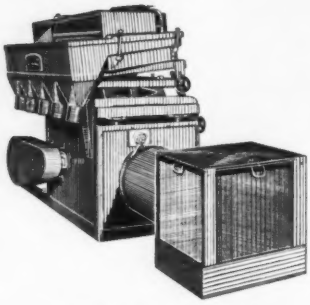
For further information about Armstrong's Glassware and complete packaging service, contact your nearby Armstrong representative or write direct to Armstrong Cork Company, Glass and Closure Division, 4209 Prince Street, Lancaster, Pennsylvania.

ARMSTRONG'S GLASSWARE

we can give you

58

good reasons why...



...it makes good sense to sit down and study out all the economic advantages of cleaning, classifying, and up-grading dry food products with Sutton Specific Gravity Separators and Air-Float Stoners. Upon request, you will immediately receive a list of 58 different food and cereal products, each representing a distinct separating problem solved by *"effecting a difference in specific gravity through air-flotation."* Chances are, the S S & S Process will answer your problem, too.

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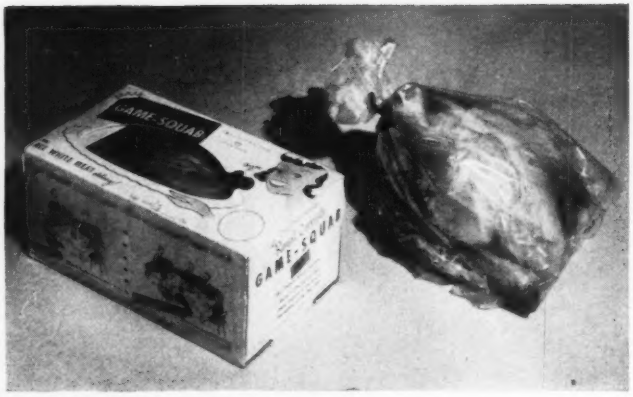

Squab Delicacy Offered in Frozen Form

An all-white-meat game squab, said to feature the flavor of Guinea hen, meat texture of grouse, and plumpness of partridge, is now being frozen and marketed by Ledgehill Game Farm, Brooklyn, Conn.

These birds are the results of years of scientific cross-breeding. They are bred on a large, modern game farm where they are vitamin-fed in small cages which are kept at a 90 deg. temperature. This limits muscular development and results in a thick, tender breast. Each bird averages around 15 oz. in weight.

They are thoroughly eviscerated, cleaned, frozen, and ready for the oven when packaged. The liver, heart and giblet are placed in a small cellophane bag inside the fowl. Each squab is placed in a cellophane bag with a paper covered wire around the twisted neck of the bag. It is then placed within a sleeve-type, self-locking tray, furnished by Standard Folding Trays Corp., Brooklyn, N. Y. The self-locking feature keeps the product secure during shipment and at the market, yet it is simple for the housewife to release.

The carton is attractively designed in maroon, blue and white with the Royal Cornish trademark prominently displayed. Top of carton has an open window in the shape of the squab, giving good product visibility.

Preparation of the fowl, which can be roasted, fried or broiled, is simple, with full directions given on bottom of carton.

For Package Data Use Reader Service

"Makings" for Cocktails in Carry-Home Pack

Marketed under the name of "Re Umberto Parti-Pal", Strohmeyer & Arpe, New York City, has introduced a novel carry-home pack, furnished by American Coating Mills, Chicago, containing olives, maraschino cherries, and cocktail onions. Each item is mounted on plastic serving trees, developed by Packease-Servease Corp., New York City (see FE, p. 75, July '51).

This pack is expected to appeal to those who like to have the "fixin's" on hand ready to make several kinds of cocktails. Convenience of the pack and variety offered present an eye-catching appeal.

In addition to the carry-home pack, the company is also offering a glass pail of packed olives (center of photo), as well as the 8-oz. and 4-oz. olive packs with serving trees (right).

On introducing these new packs, a change in label and closure was also adopted with the cooperation of Owen-Illinois Glass Co., Toledo, supplier of the bottles and closure, and Meehan-Tooker & Co., Inc., New York City, label manufacturer. New label is a red and white color combination, with red and green ink, and makes a striking display item. The color combination is carried out on the closures to give added product identification.

For Package Data Use Reader Service

"Save the Flavor" Pack

Taking a cue from saltines packaged in individual packs within a carton, Burry Biscuit Corp., Chicago and Elizabeth, N. J., using a similar approach, is introducing its pecan plantation cookies in a novel and highly protective package.

Coming from the ovens these chocolate drop cookies are heat-sealed into cellophane bags, averaging 8 to 10 per pack. Four of these packs, totaling 10 oz. are then placed in a paperboard carton which is over-wrapped with aluminum foil, tightly sealing in the contents.

This package gives two-fold protection to the product. First the aluminum overwrap seals in the flavor and crispness until the package is opened. Secondly, after the package is opened one need only break the seal on one of the heat-sealed cellophane packets, thus keeping the others fresh and crispy until ready for use.

In addition to the protective features, the carton has been handsomely designed presenting a strong sales appeal. Against the bright aluminum, of

EXTREMELY
LONG WEARING
NON-FLAMMABLE
SHRINK, HARDEN, SOFTEN
SERVICEABLE FROM
BACTERIA RESISTANT
NON-ABSORBENT
TASTELESS, ODORLESS
keep TEFLON* in mind...
Teflon, duPont's new wonder plastic fabricated by the United States Gasket Company, is proving a better material for many food manufacturing requirements. Keep its unique properties in mind for such services as:
• Pump impellers that won't gall and freeze on such difficult solutions as vinegar, molasses, fruit juices, syrups, extracts.
• No-lubricant bearings that can't contaminate the product.
• No-lubricant pump and valve packing that imposes minimum torque on shafts and spindles.
• Teflon covered header rolls on bakers' dough sheeters that reduce or eliminate flour dusting; squeeze out more air.
• Teflon candy molds that eliminate the dust, mess and explosion hazard of starch molds.
• Sanitary, Teflon-covered working surfaces, conveyors, guide rails, trays, etc.—easy to clean and keep clean, bacteria resistant, non-absorbent, slippery to the stickiest substance.
• Non-contaminating, durable gaskets, expansion joints and accessories for glass and stainless steel piping.
Teflon—fabricated by the United States Gasket Company is available in sheets, tape, engineered packings, cut and molded gaskets, covered rolls, to solve many food processing problems. Ask for catalog or tell us your requirements.
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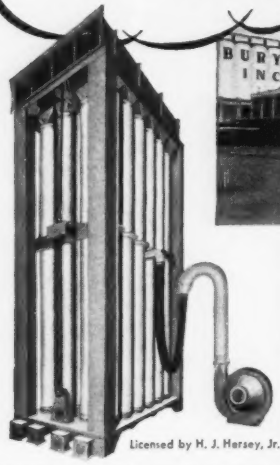
FLUOROCARBON PRODUCTS DIVISION
FABRICATORS OF "TEFLON", "KEL-F" AND OTHER FLUOROCARBON PLASTICS
CAMDEN 1, NEW JERSEY
*duPont's trademark for its tetrafluoroethylene resin.

DAY EQUIPMENT HELPS PRODUCE PILLSBURY MIXES



Licensed by H. J. Hersey, Jr.

In the immaculate Pillsbury Bakery Mix plant at Springfield, Illinois, ingredients for the family of Pillsbury Prepared Mixes are blended with slide-rule precision. This giant "mixing bowl" which serves the bakeries of America is a model of its kind—every operating unit has been selected for its functional advantages.

Here DAY-engineered, Day-fabricated and DAY-installed equipment contributes to over-all efficiency and economy. Materials are stored in DAY bulk storage bins, 41 in all, constructed from galvanized or stainless steel as the use dictates. As part of the DAY dust control systems, DAY "AC" Dust Filters control dust and capture valuable ingredients. As elsewhere in the food processing industry, these DAY installations are providing dependable, high efficiency service for Pillsbury Mills, Inc.

SELECT DAY "AC" DUST FILTERS FOR YOUR DUST CONTROL PROGRAM

CONTINUOUS-AUTOMATIC OPERATION . . . use of slow-traveling, reverse jet air cleaning rings eliminates cleaning shutdowns.

CONSTANT AIR VOLUME . . . back pressure rises slightly only when first started, then levels off and remains constant.

PARALLEL AIR FLOW . . . dust and air travel downward together.

HIGH AIR-TO-CLOTH RATIOS . . . 10, 15, and 20 to 1 ratios maintained with uniform back-pressure.

HIGH CLEANING EFFICIENCY . . . 99.998% filtering efficiency recorded by actual test.

NO DUST-CATCHING LEDGES . . . square-to-round fittings; no flat surfaces where dust can accumulate and become contaminated.

APPLICATION ADAPTABILITY . . . units furnished in multiples of 4 tubes, housed or unhoused, can be applied for either pressure or vacuum.

DAY STEEL BINS PROVIDE ECONOMICAL BULK STORAGE

DAY black iron, galvanized or stainless steel bins provide bulk storage at low cost. Materials cannot stick to the smooth inside surfaces or bridge in DAY's scientifically designed hoppers. Heat-conducting steel walls give better control of temperatures and eliminate "sweating" or inside condensation. Capacity may be increased by adding sections.

DAY bins are shipped in sections and gang-punched for easy bolting and assembly. No field riveting, soldering or welding is required. Bins can be furnished for hopper level supporting, or with expansion joints for supporting from all floors of a multiple-story building, to provide fire- and vermin-proof storage for your bulk materials.

DAY ENGINEERS, MANUFACTURES, INSTALLS:

Dust Control Systems • Exhaust Fans • Vacuum Type Bag Cleaners
Dual-Clone Dust Separators • Spouting and Leg Casing
Pneumatic Conveying Systems • Bulk Storage Bins • "AC" Dust Filters

DAY SINCE 1881

The **DAY** *Company*

817 Third Avenue Northeast, Minneapolis 13, Minnesota
IN CANADA: P. O. Box 700, Ft. William, Ont.
Branch Plants in Fort Worth, Buffalo and Welland, Ont

a checked design, a row of brown, crunchy cookies is displayed on both wide panels, with the company name, description, and other pertinent data sharply defined in red, blue, and white on all sides of the carton.

Insulated Ice Cream Pack

As an added service to its customers, H. P. Hood & Sons, Boston, Mass., is now packaging all of its 1-pt. ice cream packs in an insulated wrap.

Ice Cream is first packaged in a conventional linerless carton after which an insulated wrap of specially developed corrugated paper is formed and sealed around it. For additional protection and to present an attractive package, it is then overwrapped and sealed with gaily-illustrated colored wax paper.

Each flavor can be ascertained by the color of the overwrap, as well as by the appetizing dish of ice cream pictured on top and side of carton.

Dietetic Foods Offered

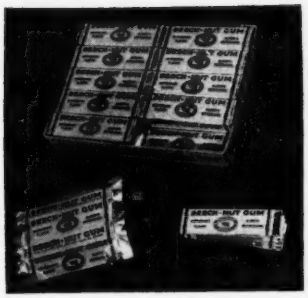
A new line of dietetic foods, called "Tasti-Diet", has been announced by Flotell Products, Inc., Stockton, Calif. It includes fruits, salad dressings, jellies, gelatins, and puddings.

Base fluid of canned fruits is a heavy syrup free of sugar and salt, made with saccarin and a non-nutritive thickening agent. These items are said to have as much as 60 percent lower caloric content than conventional canned fruits. Apricots, dark and light cherries, fruit cocktail, figs, prune plums, peaches, and Bartlett pears are presently being offered.

"One Calorie Dressing", for green vegetable salads, contains only 1 calorie per serving, and is almost fat-free. Others are "Chef's Dressing", "Roquefort-Bleu Cheese Diet Dressing", and "Whipped Dressing".

Developed to satisfy the desire for sweet-tasting desserts and spreads, a variety of gelatins, puddings, and jellies are also being offered.

Items are easily identified as all carry the Tasti-Diet trademark label in red, topped with small human figures doing reducing exercises.



Gum in Foil Overwrap

The 5-stick chewing gum packs marketed by Beechnut Packing Co., Canajoharie, N. Y., are now appearing in a high-gloss foil overwrap.

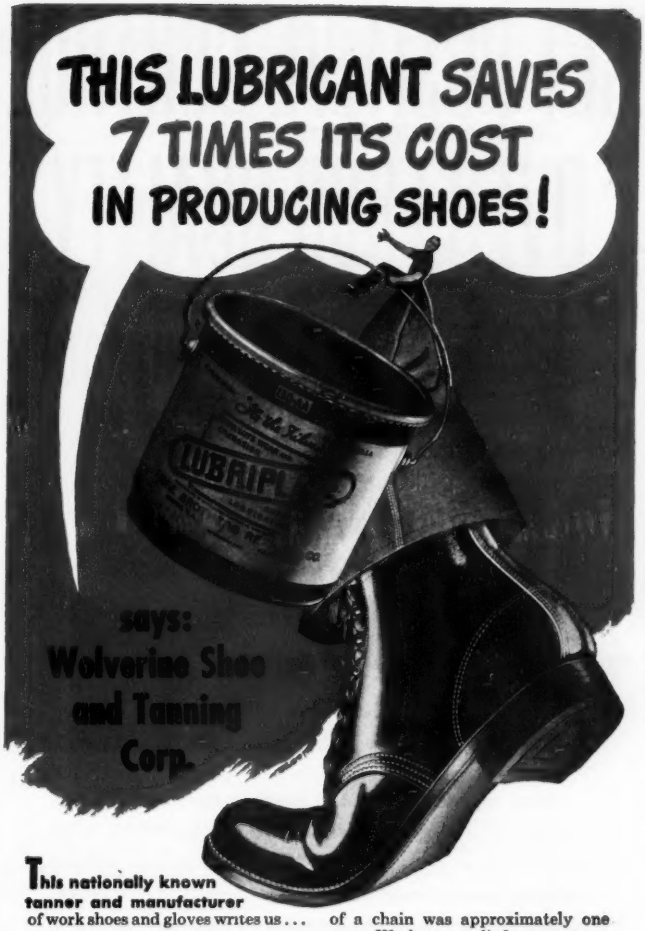
Several advantages are cited in the change from the former reverse printed transparent overwrap over plain foil-to-paper wrap that had been used. It eliminates need for reverse printing, is competitive in price, provides excellent storage and shelf life protection, and presents a sparkling eye-appealing appearance.

This changeover was developed with the assistance of Reynolds Metals Co., New York City, who furnish the printed foil in roll form. These rolls are used on package machinery equipment which wraps and wax-seals the packs at a speed of 120 5-stick packs a minute.

For Package Data Use Reader Service

New Instant Coffee

The Nestle Company, Inc., White Plains, N. Y., well-known for its Nescafe, an instant coffee with added carbohydrates, announces the development of a new instant coffee, more highly concentrated than Nescafe, which contains only coffee solids, with no carbohydrates added. Originally,



This nationally known tanner and manufacturer of work shoes and gloves writes us . . .

". . . You recommended to us LUBRIPLATE NO. 100 for lubricating the chain drive on our paddle wheels which turn the hides immersed in a solution in concrete vats. The chain, during use, is always soaked. The solution is sometimes acid and sometimes caustic. Up to the time of your recommendation, we had not found any lubricant that would stay on the chains for any appreciable time.

"Heretofore, the average life of a chain was approximately one year. We have applied LUBRIPLATE to these chains every two weeks for two years. Since then, not one new chain has required replacement, and they are still going strong.

"At this time it appears that *for every dollar we have invested in* LUBRIPLATE, *we have saved seven dollars* in chains with actual savings still to come."

WOLVERINE SHOE & TANNING CORP.
Rockford, Michigan

You, too, can enjoy the savings made possible with LUBRIPLATE Lubricants. There is a LUBRIPLATE product for every industry. LUBRIPLATE reduces friction and wear, prevents rust and corrosion and is most economical to use. Write today for case histories of savings made possible by the use of LUBRIPLATE Lubricants in your industry.

LUBRIPLATE DIVISION • Fiske Brothers Refining Company
Newark 5, New Jersey • Toledo 5, Ohio
DEALERS EVERYWHERE • SEE YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE the Modern Lubricant

GET POSITIVE CONTROL OVER FOOD QUALITY

WITH *Linde* Trade-Mark HIGH PURITY NITROGEN

DURING PROCESSING

Blanketing against oxidative deterioration

Stripping entrained air

Drying or *Dehydration* free from oxidation

Blowing feed lines

DURING PACKAGING • STORING

Vacuum break-back before closure

Purging container free-space

Broad experience gained in applying inert nitrogen to a variety of processes shows that nitrogen protection helps preserve natural food color, flavor, and aroma, reduces vitamin losses sharply, and increases resistance to spoilage. This positive, threefold protection of food quality means greater sales appeal, and increased profit because of fewer quality rejects.

LINDE High Purity Nitrogen is supplied to the food industry as a gas in steel cylinders, or as a liquid in tank-car and tank-truck lots. Stored at your plant, the liquid can be converted to gas as needed, or used for lightning-fast cooling.

Call or write your nearest LINDE office today. Let us show you how to apply nitrogen profitably to *your* process.

LINDE AIR PRODUCTS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION
30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation

addition of carbohydrates was made to add to storage life of the product. However, it is stated that the process used to manufacture the new instant coffee will result in the same high quality and storage life. And, it is completely soluble, going into complete solution in ice water as well as hot.

The new coffee is being introduced in two sizes, the 2-oz., and the 4-oz. jar, carrying a distinctive yellow label with blue and red lettering. The company will continue to market its Nescafe, a 13-yr. old favorite with many people.

Frozen Melon Balls

Cantaloupe and honey dew melon balls are being frozen and packed for retail market by Lodi Frosted Foods, Lodi, Calif.

These colorful green and yellow melon balls are packed in light syrup with salt added, into 1-lb. wax-coated, metal end, paperboard containers. Cartons, furnished by H. S. Crocker Co., Inc., San Bruno, Calif., are gaily lithographed in the green and yellow color of the melons with the frosty Valley Frost trademark in red, white, and blue.

For Package Data Use Reader Service

—*End*—

X-Rays Control Infestation

—*Continued from page 77*

ernment standards on grain grading may need some revision. If millers could buy partially infested wheat at a discount, they could then afford to develop and use special apparatus that could, by aspiration and other processes, blow infestation out of the wheat—along with some lightweight wheat particles—and thus salvage some of this grain for certain uses.

This would be a marginal operation, but could help increase the total yield of flour for the nation and at the same time reduce the insect toll.

Present Federal grain grading standards are not conducive to reducing hidden insect infestation. The rules say that one has to see evidence of more than three live bugs per 100g. (or per 3,800 kernels) in order to call a carload "weevily."

See latest word from Washington as relayed in special wire (reproduced on second page of this article)—Editor

The Grading Section of the U. S. Department of Agriculture—working at the mill *receiving* docks—has not yet brought its standards into line with what the F&DA people expect in the way of purity in the finished flour and feeds that leave the mills' *shipping* docks.

The above situation means that mills must use stricter grading methods on the grains they receive to conform with the stricter F&DA standards.

But further than that, millers hope that the X-ray technique will provide the mechanism for new grading standards at the country elevators and beyond, so that grain can be bought on a guaranteed purity basis. They believe that X-ray equipment can pay for itself at these locations by enabling them to cut their losses due to mill rejections and uncontrolled, unknown infestation in their bins.

Then there are the substantial financial benefits to be gained by a faster method of grain inspection during rush season at the mills—thus cutting down on "sit and wait" time at dockside. This can be cut even further if private elevator operators and co-ops are sure that their grain will pass X-ray inspection *before* they send it to the mill.

Grain storers can also use the new X-ray unit effectively to keep infested lots out of their bins to begin with, and also spot those suppliers who consistently bring them bad lots—with a view to educating them on sanitation procedure.

Cooperative Work Needed

Crete Mills is presently doing special work in this problem in cooperation with five other mills and laboratories. Films of artificially infested wheat samples are being sent around among the six organizations in the hope of setting up standards by which wheat can be judged everywhere.

In the above investigation, kernel counts are being made to establish a "fair and average count of known weight" for wheat of different varieties, oats, corn, barley, and other cereal grains. The X-ray films of these

uniform surface retards wear ...provides greater pulley grip

Globe Solid Woven White Cotton Belting conveying layer cakes for boxing and wrapping in a modern bakery.

Long after other belts have lost their grip, Globe Solid Woven White Cotton Belting continues to move the goods that bakers bake . . . continues to move the grain that millers grind, that makes the flour that bakers bake!

This is the belting that is preferred by the baking and milling industries for light conveyor and elevator applications, because it is firmly woven into a balanced, continuous construction that eliminates excessive stretch and ply separation. It holds fasteners better than belting of looser woven construction. And its uniform surface has more resistance to wear, better pulley grip, and a better distribution of abrasive action.

Globe Solid Woven Cotton Belting is made in all widths up to and including 62", and in plies from 2 to 8 inclusive. Among allied industries using it are biscuit and cracker plants, cereal mills, and many other types of food processors and packers.

Prove Globe quality by comparison. Write Dept. F9 for free samples and literature . . . and the name of your local distributor.

GLOBE

WOVEN BELTING CO., INC.
KNOWN FOR QUALITY THE WORLD OVER

1400 CLINTON ST., BUFFALO 6, N. Y.

here is a

VERSATILE*

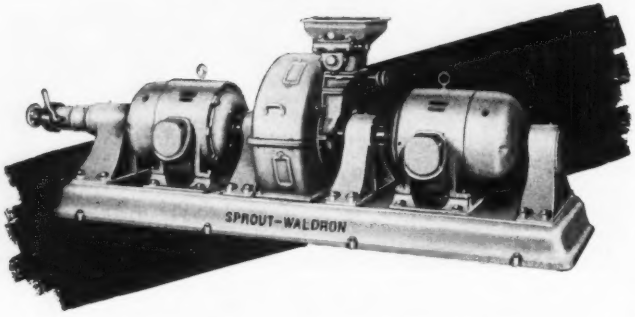
GRINDER

*for RUBBING

*for CUTTING

*for CRUSHING

*for PULVERIZING



This versatile Sprout-Waldron Attrition Mill performs an amazing variety of size reduction jobs. It's easy to adjust to do different tasks. You simply change the disc surfaces, the rotation speeds, the clearance between the surfaces, or the method of feeding.

It has tremendous capacity and is so compact that on most applications it will do the work of machines that take up three times the floor space. Yet it requires only ⅓ as much maintenance as other types of grinders. It is available in sizes using from 3 HP to 400 HP.

If you have *any* size reduction problem, Sprout-Waldron is exceptionally well-equipped to help you. Why not benefit from the experience we have gained in making hundreds of successful installations in the food processing and allied fields? Write for full details to Sprout-Waldron & Co., Inc., 35 Logan Street, Muncy, Pennsylvania.

SW

MUNCY, PA.

SPROUT-WALDRON

The Best in PROCESSING EQUIPMENT *Since 1866*

250

weighed and counted grains are being employed to reach a basis of mutual understanding of weathering, handling, and infestation damage.

Also, to check insect debris in wheat flour, we are launching a program in which a known weight of ground weevils is mixed with a known weight of ground flour. This will be examined grossly, by cracking flotation, by microscope, and with X-ray. And conclusions will be widely disseminated.

End (Resume reading on page 78)

Faster Egg Grading

—Continued from page 92

a circular dial. Each lot of eggs is accompanied by a producer's ticket upon which the truck driver has written the number of cases, or fractions of cases, picked up from the producer.

The candler inserts this ticket into the counter, and it prints the count of each grade of eggs, producers being paid from this record. The counter tabulator, when reset to 0 at the start of the next lot, automatically will pick up any fractional count as partially filled containers are completed.

Each candler has a safety switch with which she may stop the grader if it is delivering eggs too rapidly. The service operator also may stop the machine by another switch if desired.

For wholesale packing operations, a series of four or five units is recommended as a minimum installation.

End (Resume reading on page 93)

Dough Pump

—Continued from page 83

of a barrel or vessel and had a long suction tube which located down in the product. Actually, this "suction tube" comprised the chamber for a pumping piston operated reciprocally by an air-powered motor atop the pump.

In effect, the mechanism worked like a bicycle pump. It drew material in at the bottom of its tube and discharged it—by upward movement of its pumping piston—through a surge eliminator at the pump outlet.

Because of its unimpeded routing of product in upward suction through a smooth walled piston tube—no churning or back-movement was possible—the device looked like a "natural" for soft dough handling. And the theory soon proved out in practical tests.

A few minor changes were necessary to adapt the technique to in-plant op-

erations. For one thing, a completely stainless steel unit was desired by the company, and the supplier complied with this by designing a specially fabricated and modified unit for the job. Also, there was a slight change in mixing methods to secure maximum results in pumping. Happily enough, the new mixing procedure coupled with pump handling gave a better bottom on finished goods.

Another improvement suggested itself when the pump was installed. It was found expedient to replace the 10-ft. troughs with compact, deeper 5-ft. long stainless steel units. These new troughs are filled to the top with the same barrel and a half of mix—thus halving the surface to be hand cleaned and permitting 50 percent greater pump operation without need for hand shoveling of product to the pump inlet.

Operating Details

As used in the plant today, the new dough mover is suspended from a hoist at the side of a band oven and thus hangs down into a trough which is wheeled below. At present, its use is confined to soft doughs—such as vanilla wafer and fig bar mixes—which are handled by the special wire-cut feed hopper.

One man now stands at the feeding station to supervise discharge of troughs. Since the pump is operated by air pressure—about 80 psi. is used—it's a simple job to keep the feed hopper at proper level by adjusting pump speed through its air pressure regulator. This attendant also wields a shovel during the final moments of trough emptying in order to get all product within range of the feed end of the pump.

Sanitation of the pumping unit has proved a simple routine. After a production run, the whole unit is toted by one man to a nearby sink, where the air motor is quickly separated from pump proper. The latter is then flushed out, scrubbed thoroughly with hot water, and sterilized with live steam.

While the simple act of eliminating man-handling of dough is a vital improvement in product sanitation, the company is carrying out other plans—made possible by the new pumping system—which will further boost its high standards.

Permanent stainless steel piping is now being installed to carry the dough from pump to hopper. And the hopper itself—formerly open to receive hand-fed batches—is getting a tight-fitting stainless steel cover for complete protection against entry of foreign material.

End (Resume reading on page 84)

After 2 Years—

REGAN BROTHERS BAKERY, Minneapolis, says —— THE MULTI-CLEAN METHOD is TOPS in Floor Care

All wood floors in this high production bakery were treated with Multi-Clean Bakery Floor Preserver two years ago. Since that time, only heaviest traffic lanes have needed touching up and these not oftener than every four months. Floors subject to normal foot traffic have needed no refinishing, and floors in the sugar and flour storage rooms will last another two to three years without refinishing. This record of the wearing qualities of Multi-Clean Bakery Floor Preserver has cut its cost down to less than 1c a year per sq. ft. per coat. Other benefits have been—

Better Sanitation: Cracks and crevices completely sealed against dirt and infestation. The hard, lustrous, non-slip finish resists fats, oils, water, sugar and alkalies . . . withstands the punishing weight of bakery trucks . . . is easy to clean . . . safe to work on.

Minimum Maintenance: Dry sweeping keeps floors clean, safe and attractive . . . no more tedious hand scraping since jellies, raisins and other sticky foods do not adhere to the surface. Weekly damp mopping completes all other cleaning requirements. An occasional steel wooling with a Multi-Clean Floor Machine maintains the floor's lustre.

Easy Touch-Up And Refinishing: Overlaps do not show and whether refinishing an entire floor or just touching up traffic lanes, the rapid drying finish is ready for use in 90 minutes . . . no time lost in production schedules.

The MULTI-CLEAN METHOD

MULTI-CLEAN BAKERY FLOOR PRESERVER
penetrates the fibres of wood floors, preserving them against water, fats, alkalies, sugars, etc. Highly resistant to mold and bacteria.

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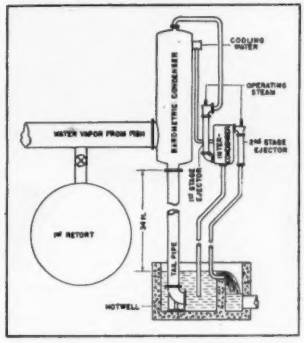
ADVANCES IN TECHNOLOGY

Vacuum Treatment of Fish After Precooking Removes Undesirable Moisture and Odors

Important advantages are indicated for the application of vacuum in pre-treatment of some kinds of fish for canning. It achieves the lowered moisture content required for sardine-type packs, removes characteristic odors, and, in case of tuna, cools the fish very quickly.

Precooking is followed by evacuation of the retort containing the fish in unsealed cans or on trays. Evaporation of moisture is virtually instantaneous since water throughout the fish boils at the boiling point corresponding to the vacuum produced. Rapid cooling takes place simultaneously. However, too rapid application of vacuum may lead to disruption of the flesh by the escaping water vapor.

For industrial application of the process, the most suitable equipment would consist of a barometric condenser and steam-jet ejectors connected to several cannery retorts (see illustration above). The retorts, which would be evacuated in succession, would still be available for the customary pressure retorting at all times. The condenser could be operated on either river or sea water.



Such an installation, connected with three "3-car" retorts, could be used to pre-treat about 1,000 cases (48 cans, 1-lb., each) per 8-hr. day. It would require 150 gal. cooling water per min., 410 lb. steam per hr., and cost about $5,000. Equipment of this size would serve about 10 retorts for tuna cooling. It would cool the fish in about 20 min.

Digest from "The Application of Vacuum in Pre-Treatment of Fish For Canning," *Progress Reports of the Pacific Coast Stations*, No. 91, Vancouver 2, B. C., 10-12, June, 1952.

Curing Salts Inhibit the Growth Of Spoilage Organisms in Pork

Investigation of effective preservative levels of sodium chloride, sodium nitrate, and sodium nitrite as curing agents in comminuted pork trimmings, showed that either sodium nitrite or sodium chloride delayed spoilage of inoculated meat for from 1-4 week, but that sodium nitrate had no prohibitory effect.

The pork was inoculated with known amounts of *Clostridium* species P. A. 3679 and incubated at 98.6 F. Preservative effect of the curing salts was then determined by bacteriological and chemical analyses, as well as by the appearance of the meat.

Varying degrees of bacteriostasis were shown by levels of 3.5-4.4 percent NaCl, but no spoilage was observed at concentrations above 4.4 percent. Initial levels of $NaNo_2$ of 0.037 or more delayed meat spoilage. Meat containing as little as 0.0004 percent nitrite was sound. A combination of chloride and nitrite showed inhibitory action, and use of the three salts prevented spoilage of inoculated meat for as much as 12 weeks.

Digest from "Preservative Effect of Various Concentrations of Curing Salts in Comminuted Pork," by Cornelius Bulman and J. C. Ayres, *Food Technology*, Vol. 6, 255-259, July, 1952.

Condensed Fish Fluids Yield Animal Feed

By a patented process of treating the press fluids obtained from relatively inedible fish, a product is obtained suitable for animal or poultry feed which contains a maximum percentage of the original food ingredients and vitamins.

The product is a syrupy liquid which does not decompose or ferment in storage, and which may be further concentrated to dryness without decomposition. According to the invention, the aqueous portion of pressed fish fluids is concentrated without separating any suspended or dissolved solids, or oil-in-water emulsion.

This raw stock is pumped to the top of a conical separating chamber and enters through a central hollow shaft on which rotating vanes are mounted. Below this chamber is a combustion compartment products of which are discharged just below the rotating vanes of the separating chamber. Fluids are thrown off the fan blades, and are subject to heat of the products of combustion which, at the tip of the fan blades, is 150-170 F.

The fluid is further concentrated in a vacuum evaporator using the latent heat of the exhaust gases from the separating chamber. Phosphoric acid is added to the final concentrate at a rate of 0.5-5.0 percent. This has a stabilizing and preservating effect.

Digest from U. S. Patent 2,595,180, issued April 29, 1952, on an application dated Sept. 30, 1948, to D. B. Vincent, Tampa, Fla., assigned to Dan B. Vincent, Inc., Tampa, Fla.

DAIRY

Stability of Frozen Goat's Milk

High-quality goat's milk when pasteurized, frozen and stored at a temperature between 0 and −17 F., will keep satisfactorily for from 2-5 months. The lower the temperature within these limits, the better and more reliable will be the results.

These are conclusions based on an

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investigation at Beltsville, Md., where goat's milk was pasteurized at 143 F. for 30 min., cooled to 50 F., canned, frozen and stored at 14, 0, −17 and −35 F. Samples were also homogenized at 2,500 psi. at 130 F. and pasteurized as above. Ascorbic acid (20, 40, 50 or 100 mg. per l.) was added to some of the processed samples.

Storage at 14 F. was unsatisfactory, and −35 F. gave no better results than −17 F. Freezing temperature was found to be less important than storage temperature. Best results, both in body stability and flavor, were obtained by storing at −17 F. (22 + weeks). Samples stored at 0 F. retained satisfactory body and flavor approximately 11 weeks.

Unhomogenized samples remained satisfactory approximately 2 weeks longer than the homogenized ones. Addition of less than 50 mg. ascorbic acid per l. of milk was ineffective in controlling oxidized flavor, but 50 mg. or more increased keeping time approximately 50 percent. It had no measurable effect on body.

Digest from "Stability of Goat's Milk in Frozen Storage," by F. M. Grant, BDI-Inf-136, May 1952. Issued by USDA, Bureau of Dairy Industry, Washington 25.

Psychrophilic Bacteria In Pasteurized Milk

Presence of large numbers of psychrophiles in pasteurized milk after one week storage at refrigerator temperatures suggest the possibility that some mesophiles develop psychrophilic tendencies. Further substantiation lies in the fact that freshly pasteurized milk containing no detectable psychrophiles and small numbers of mesophiles shows more psychrophilic than mesophilic bacteria at the end of a week's storage.

Samples of raw, pasteurized and bottled milk were taken from several plants. Pasteurization was by both vat (143 F. for 30 min.) and HTST (161 F. for 16 sec.) methods.

Raw samples averaged 160,000 mesophiles, pasteurized 15,000. Psychrophilic counts on raw milk approximated 48,000, pasteurized 0.00 per ml. After 1 week at 40-44 F., vat pasteurized milk averaged 50,000 psychrophiles, HTST 59,000, mesophiles averaged 26,000 and 50,000, respectively.. No explanation is given for the highest counts in HTST pasteurized milk.

Freshly bottled milk often contained appreciable numbers of these organisms. This suggests post-pasteurization contamination by pipelines, fillers, and bottles. Higher counts of

(Turn to page 177)

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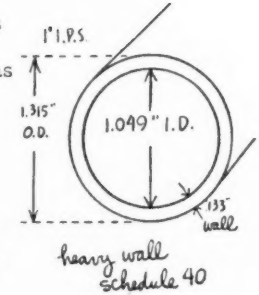
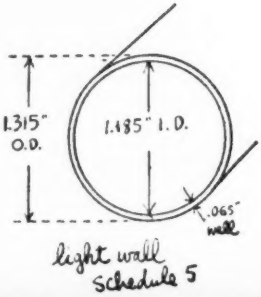


But today with the high strength/weight ratio of stainless steel, the great majority of pipeline and process applications will have an ample margin of safety with this



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samples of the first milk from a filler than the last confirms the contaminating effect of pipelines and fillers, and a study of fresh washed bottles showed 15 of 34 containing these organisms.

Digest from "Some Factors Which Contribute to the Psychrophilic Bacterial Count in Market Milk," by F. A. Rogick, and L. H. Burgwald, *Journal of Milk and Food Technology*, 181-85, July-Aug. 1952.

BAKING

To Prevent Staling Keep Bread Hot

When bread is kept in warm storage, it will stay fresh longer.

This is the conclusion reached after an extended study by researchers of the American Institute of Baking. It confirms findings of a Dutch scientist who, in 1928, found that bread stored at 140 F. would stay fresh indefinitely.

In determining degree of staleness, the researchers used a compressibility test, first, because it is the method commonly employed by the housewives, and, second, because there is evidence of correlation between changes in compressibility and changes in freshness.

In the tests it was found that bread stored at 110 F. for 100 hr. was as soft as that stored at ordinary room temperature for 40 hr. And that after 20 hr. at 30 F. bread lost as much in softness as that stored at room temperature for 75 hr.

Five practices recommended to bakeries are: (1) Provide an adequately heated loading dock; (2) store trucks in heated space between time of loading and start of delivery; (3) use insulated truck bodies; (4) provide heaters to offset loss from truck body, and (5) eliminate drop boxes.

Digest from "Keep That Bread Hot!" by Philip Talbott, *Marketing Activities*, (Published by USDA Production & Marketing Administration, Washington 25, D. C.) 3-6, June, 1952.

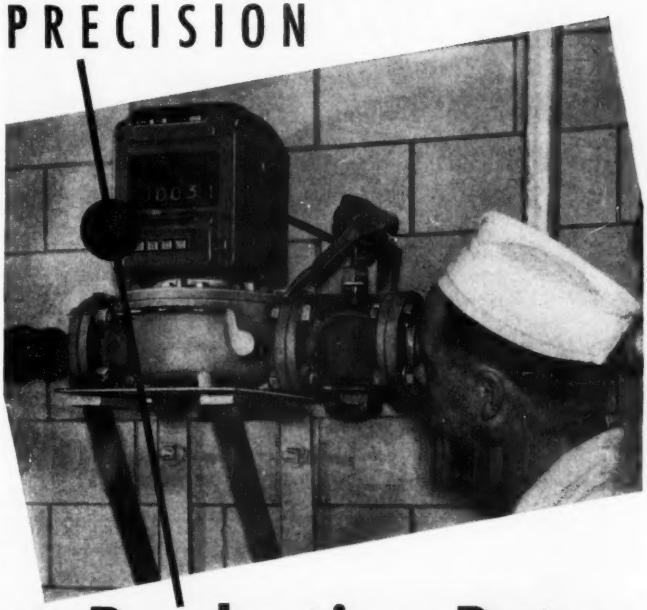
FRUITS & VEGETABLES

Protecting Apple Juice

Pasteurization at 145F. for 10 min. followed by slight carbonation insures good keeping quality in bottled apple juice.

This was determined by two sets of experiments. In the first, 7-oz. bottles of sterile juice were inoculated with pure cultures of a number of organisms previously isolated from apple juice. Then CO_2 contents were adjusted to 0.75, 0.50, and 0.0 volumes, the bottles incubated at room temperature and at 77 F., and ex-

LABORATORY PRECISION



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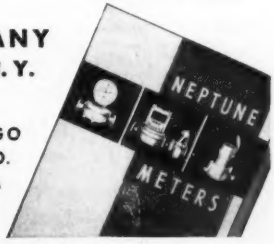

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Booth 157
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*Patents applied for by H. J. Hersey, Jr. and Pulverizing Machinery Company

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amined at regular intervals for growth characteristics of each organism.

With the exception of yeasts, the majority of the isolates were unable to develop in the presence of 0.75 volumes CO_2.

In the second experiment, bottles were filled and inoculated as above, then placed horizontally in a pasteurizer and carefully heated–from 60-145 F. in 23 min.–and held at this temperature. At 5-min. intervals from commencement of heating, 1-ml. samples were removed, plated, and incubated at 77 F. for 48 hr. and 5 days.

Thermal death-times of each organism was less than 30 min. from start of heating.

A further investigation on juice that had been held in Boehi pressure tanks for several months demonstrated that certain species of *Penicillia* may develop resistance to this heat treatment. However, growth of these organisms was completely restricted by presence of 0.75 volumes CO_2 in the first investigation.

Digest from "Some Aspects of Microbiology Applied To Commercial Apple Juice Production. Part IV. Development Characteristics and Vitality of Spoilage Organisms in Apple Juice," and "Part V. Thermal Death Rates of Spoilage Organisms in Apple Juice," by C. R. Marshall and V. T. Walkley, *Food Research*, 197-211, May-June, 1952.

Storing Sweet Potatoes

Temperature and variety are major factors in determining the behavior of carotenoid pigments of sweet potatoes during storage.

Determinations were made of carotene, total carotenoids, ascorbic acid, moisture content, and weight of Yellow Jersey, Nancy Hall, Porto Rico, and Orange Little Stem sweet potatoes at time of harvest, after curing 8 days at 85 F., and at intervals during storage at 50, 55, 60, and 70 F. Relative humidity was maintained at 85 percent during entire storage period.

There was little increase in carotene or total pigment in any of the varieties stored at 50 F., and in Orange Little Stem a highly significant decrease was noted.

At 55 F. there was little change in carotent pigments, and at 60 deg. an increase of nutritional importance was observed in all but the Nancy Hall variety. At 70 carotene and total carotenoids increased less rapidly than at 60 except in Yellow Jersey.

In the case of ascorbic acid, a common level was approached during storage at all temperatures.

Yellow Jersey showed a maximum increase in carotene during curing and storage. Orange Little Stem increased approximately 25 percent. Nancy Hall

and Porto Rico exhibited decreases.

Temperature of storage had little effect on moisture content. Weight losses were least at 60 F. (approximately 15 percent in 8 months), slightly greater at 55, and still greater (22-38 percent) at 50 and 70 F.

Digest from "Influence of Storage Temperature on Carotene, Total Carotenoids and Ascorbic Acid Content of Sweetpotatoes," by B. D. Exell and M. S. Wilcox, *Plant Physiology*, 81-94, Jan. 1952.

BEVERAGES

Clarification of Wines

Filtering wine through an ordinary filter aid mixed with a cation exchange material is the crux of a recent patent for clarifying and preventing precipitation of tartrates after bottling.

According to the present invention this is accomplished by adding to the wine a mixture of a filter aid and a cation exchange material, and filtering. Typically, the mixture may contain 90 percent filter aid and 10 percent active ion exchange material. This is added to the wine in the range of 0.1-2.0 percent by volume.

The quantity added depends on the ash content of the wine expressed in terms of potassium concentration. The potassium ion in the undesired tartrate is exchanged with a hydrogen ion, producing tartaric acid. The method proceeds logically from analysis of the wine to treatment on the basis of that analysis.

Digest from U. S. Patent 2,600,085, issued June 10, 1952, on an application dated Oct. 7, 1947, to John C. van Dyk, Bernardsville, assigned to The Product Developers, Inc., Bernardsville, N. J.

Sources of Beer Instability

Beer stability depends on both biological and non-biological soundness. Biological stability depends largely on cleanliness in processing and handling of finished beer. Cleanliness must be a part of manufacturing routine else it may be overlooked at a really critical point.

Non-biological instability can start with improperly modified or slack malt. Protein-metal complexes, produced by contact with tin, copper, or nickel, and protein-silica complexes due to excess soluble silica from highly silicious malts or excessive sparging with alkaline water, can be sources of hazes. Bottles washed with over-caustic and highly silicated soaker solutions may also be responsible. Low calcium waters can delay calcium oxalate precipitates till after the beer is bottled.

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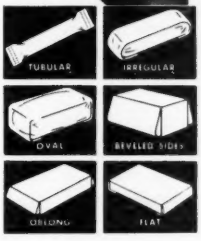

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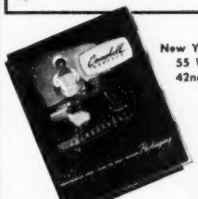

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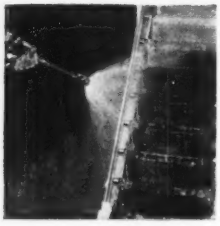

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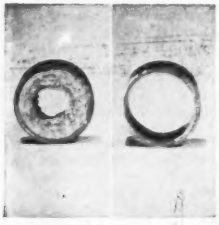

Photographs of water pipe before and after it had been descaled with Oakite Compound No. 32.

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cooling surface (1,120 sq. ft. per bbl.) favor sludge removal and clear worts during fermentation. Trub carried into the fermenter from wort coolers tends to redissolve and precipitate later. Autolyzing yeast also liberates potential haze formers, and should be avoided by low pitching rates and low fermentation temperatures, as well as by prompt removal of the beer from settled yeast.

Carbon dioxide used for gas washing, transfer, and carbonation of beer should be at least 99.5 percent pure, and, after fermentation is completed, beer should be handled so as to avoid contact with air when transferring it from tank to tank.

Beer colloids are in a delicate state of equilibrium and can be disturbed by agitation, pH changes, temperature differences, and sometimes by blending, though blending of the same types of beer, made by essentially the same processes, is rarely a source of instability.

Digest from "Beer Stability," by A. A. D. Comrie, *Brewers' Guild Journal*, 1-12, Jan. 1952.

SUGARS

Sugar Extracted From Cane By Diffusion Apparatus

Substantially complete extraction of sugar from cane by diffusion in hot water is claimed for improved apparatus recently patented. Invention resides in changing intermittently the direction of flow of the water across the tank in order to prevent packing of the chips, and in means for preventing the formation of a floating cushion of cane shreds, or bagasse, that usually escapes complete diffusion.

The apparatus comprises an elongated tank heated from below, through which cane chips are moved by a series of flights mounted on endless chains passing over powered sprockets. In their passage through the tank the flights form compartments, each containing a quantity of chips. For most of its length the tank has double-wall sides, forming chambers for the circulation of diffusing water.

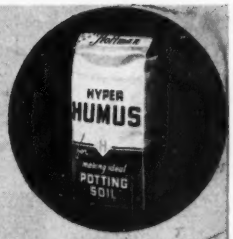
Inner walls of the chambers are perforated, permitting free flow of water between the chambers and the compartments formed by the flights. The latter have hinged members which, as the flights start on their way through the tank, are tripped into a horizontal position and form a cover to the compartment.

A series of valves, actuated by the machine, makes it possible to force water across the tank and through the compartments, first in one direc-

puzzled?

DUO-TITE . . . . . ▸

the perfect "No-Sift" bag. Ideal for insecticides, fertilizers, chemicals, any products which must be packaged in siftproof containers. Its sturdy construction combines special liners with folding, gluing and heat-sealing.



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the bag with 20% more protection. It's a fact. There is 20% more protection in Betner's THERMOSEAL than in other closures. Eliminates staples. Insures water-vapor protection, siftproofness, and retention of flavor.

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the bag with extreme moisture-impregnability. Locks moisture out. Protects freshness, flavor, goodness of food by a patented film of rubberized compound held firmly in suspension between two layers of glassine.

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the bag with vacuum-packed freshness. Pliofilm* lined, all inner seams are hermetically sealed. Replacing air with inert gas, and sealing top, FLAV-O-TAINER becomes an airtight unit. Used whenever freshness is a must.

*Mfd. by Goodyear T. & R. Co.

Betner's service is complete. Betner has the facilities, the packaging know-how and cost-conscious experience to recommend ideas . . . produce finished bags . . . advise you of the proper machinery to insert liner bags in cartons.

NO, SIREE! No need to crack the cranium over solutions to difficult packaging problems. Just turn them over to Betner. Betner's designers and technicians are only too anxious to "show-off" their know-how and experience by making short work of the toughest packaging puzzles. Betner experts have long been making bags to suit the most demanding needs—special folding, gluing, heat-sealing and multi-color printing . . . features that add up to economical, finished bags with sell-appeal. And Betner specializes in holding production costs to a minimum. Won't you give us a try?

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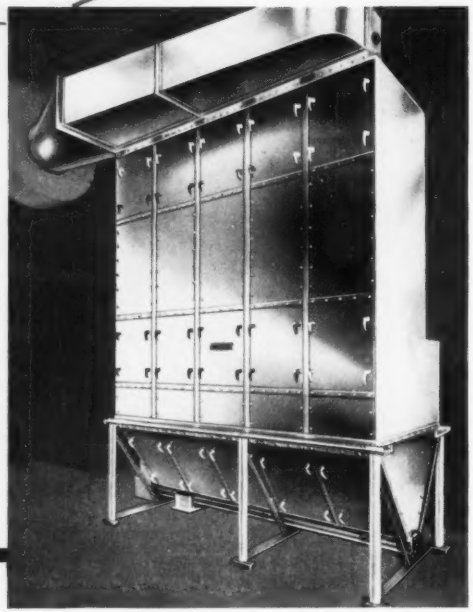
- *LOS ANGELES, CALIFORNIA*

$ave $ out of DU$T

...in the Processing of FOOD PRODUCTS



This equipment employs the basic principles of dust collector construction and operation developed in over forty years of experience throughout the world.

Intended specifically for the economical recovery of valuable dust from exhaust systems in process manufacturing, this unit has proven its ability to yield a high rate of return on the investment. It is a suction type, tubular cloth filter collector featuring a housing constructed of aluminum and a simple automatic cleaning mechanism. High air to cloth ratios, low maintenance, low power requirements (¾ H.P. for all sizes) and maximum accessibility are other unique advantages of this design.

- High air to cloth ratios
- Only one ¾ H.P. motor required for all size units
- Long filter cloth life
- All parts easily accessible
- Minimum floor loading
- Greater cloth area for unit floor space

Send for new, illustrated bulletin describing the Simon Suction Filter Dust Collector. ENTOLETER DIVISION, The Safety Car Heating & Lighting Co., Inc., P.O. Box 904, New Haven 4, Connecticut.

SIMON SUCTION FILTER
DUST COLLECTOR
U.S. Design and Manufacture by
ENTOLETER DIVISION

tion and then in the other. This washing process, in combination with means for holding the cane material below the surface of the water, insures practically complete extraction of sugar.

Digest from U. S. Patent 2,581,175, issued Jan. 1, 1952, on an application dated Feb. 4, 1950, to Antonio F. de la Calle, Mexico City, Mexico, asigned to Delta Investment, Inc., Habana, Cuba.

Removing Ash From Cane Juice

Ten cation and 7 anion exchange resins were tested on both NaCl solutions and on cane juice in a large number of cycles (up to 1,500). With one exception the resin showed no loss in efficiency of removal of NaCl, though there was a loss in capacity, of 52-81 percent at the 90 percent removal point.

It was not possible to predict the behavior of the resins on cane juice from the results obtained with NaCl. With one exception all resins tested showed a significant reduction in ash removal capacity on cane juice after 500 cycles. Some resins that were not outstanding in NaCl removal gave good performances on ash in cane juice, and vice versa.

Digest from "Ion Exchange Resins in Sugar Cane Juice Processing, Practical Life and Capacity," by J. H. Payne, H. P. Kortschak and R. F. Gill, Jr., *Industrial and Engineering Chemistry*, 1411-21, June 1952.

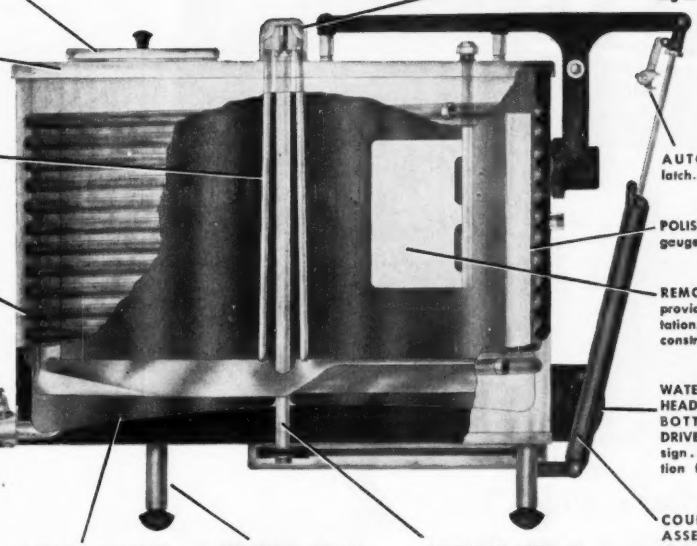
Continuous Beet Extractor

In a patented device for obtaining sugar from beet slices, the latter are moved through towers countercurrent to the flow of the extracting liquid.

The present invention lies in means for feeding a steady flow of beets and in regulated quantities; and introducing them below the surface of the liquid in the extraction apparatus in such a way as to eliminate the need of special filters to separate the juice from the beets. For this reason the upper end of the shaft on which the conveyor screw is mounted in the first tower is made hollow and is connected to a source of beet slices. The hollow shaft contains its own screw conveyor that moves the slices downward to a point below the level of the extracting liquid. Here they are discharged and guided by baffle plates onto the large conveyor in the first tower, and are started on their way through the extracting liquid. The top of the first canal of the large conveyor screw is perforated to permit extracting liquid to flow upward and thus be separated from the slices.

Digest from U. S. Patent 2,577,135, issued Dec. 4, 1951, on an application dated June 6, 1950, to Eugen Langen, Elsdorf, Germany, assigned to Pfeifer and Langen, Elsdorf/Rheinland, Germany.

You'll want all these advanced Pfaudler features in your next pressure process vats . . .



INSPECTION OPENING with 5-in. "Lift-Off" stainless steel cover.

INSULATED COVER—One-piece, all welded stainless steel. Lifted by counterbalance.

AIRPLANE TYPE AGITATOR with truss supports. Can be easily lifted and disengaged from the drive shaft with one hand.

STAINLESS STEEL PRESSURE JACKET surrounded by 2-in. compressed fiberglass insulation, polished stainless steel sheathing.

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CONVEX BOTTOM HEAD—Gives extra strength and just the right pitch for complete drainage.

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AGITATOR TUBE of welded stainless steel extends above liquid level—no need for packing or rotary seals.

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REMOVABLE BAFFLE provides improved agitation. Stainless steel construction.

POLISHED LINER of 14-gauge stainless steel.

AUTOMATIC cover latch.

AGITATOR COVER CAP—Agitator bearing surface is above liquid level. This eliminates need for agitator opening in vat liner.

LARGE PFAUDLER pressure process vat with agitator drive at top.

For processing such products as syrups and margerine, Pfaudler Pressure "Lo-Vats" deliver the efficient heating, holding, cooling and mixing that help to keep your operating costs at a minimum. Highly versatile, these "Lo-Vats" can be readily adapted to different processes. To help speed changeovers, they are self-draining and simple in design for easy cleaning.

Jackets are built to withstand 150 lb. pressure—no danger of damage through operating error. A multiple jet manifold provides rapid heating with steam or hot water. For cooling, chilled water, ammonia or Freon can be used.

It will pay you to consider all these important Pfaudler features before you buy your next pressure vats. Made in 100, 200, and 300 gallon capacities. Also, larger Pfaudler Pressure vat with agitator installed at top is available in 500, 800 and 1000 gallon capacities.

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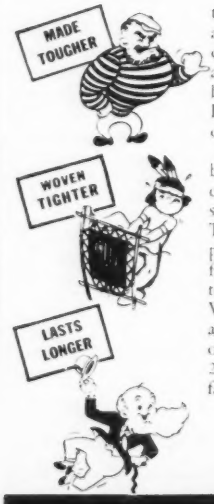

"My father always said that 'the things that last you the longest cost you the least'. You know I'm often accused of being a little conservative but that good old fashioned advice has served me pretty well. We always buy the best for our plant if it will give us longer service. The wonderful part of these Buffalo Belts is that they don't cost a cent more than those other belts."

Here is another typical customer reaction to these better Buffalo Conveyor Belts. These solid woven cotton belts are MADE TOUGHER by taking the strongest cotton yarn available and WEAVING IT TIGHTER with our exclusive WOV-IN-WEAR process. From more than 50 years of experience, we've found out how to weave under HIGHER TENSION to produce a belt that always LASTS LONGER. Would YOU like some good old fashioned proof of a product's superiority? Ask your mill supply jobber or write us direct. Buffalo Belts are available in over 200 sizes, 35 widths, 7 thicknesses and 7 special surface treatments.

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Packers Weigh Trends

—Continued from page 94

major products, in the order of their popularity, are canned hams, chili con carne, corned beef, corned beef hash, Vienna sausage, frankfurters, deviled ham, and other potted or deviled meats.

A recent survey by one of the country's leading pollsters indicated that the increased use of canned meats was in addition to—not at the expense of—fresh meats.

This trend pleases the meat packer for at least one specific reason. Formerly, the pork shoulder was hard to move in regular smoked meat channels—literally a drug on the market. Today, due to the tremendous acceptance of 12-*oz.* luncheon meat, it commands a premium and has a stabilized demand throughout the year. For the grocery trade, canned meats have become an important factor in sales because they are a fast-moving profitable item with a low handling cost.

The Sausage Situation

Today, every man, woman and child in the United States eats an average of 23 lb. of sausage a year. This is about one-seventh of the meat our people buy. Frankfurters and wieners now represent 30 percent of the total production of all sausage.

It is interesting that families of two or more persons with incomes (before federal taxes) of $3,000 to $3,999 spent more for frankfurters and bologna per week than the households whose average income ran $7,500 and more yearly. For fresh pork sausage, there was a difference of but one cent weekly in expenditures between the lowest and the highest income families.

Another tidbit of food research: A survey covering 750 housewives revealed that 95 percent of the women want top-quality sausage. They look for flavor, good color, and texture. On pork sausage, they voted for a lean product. Bologna must be lean, moist, and contain no gristle. They want frankfurters and wieners lean and moist, though they will accept ham sausage with a trifle of fat. Women welcome more information about sausage, including new suggestions for serving.

Three important questions asked the 750 women were: "What sausage items do you serve frequently?", "Name those you serve occasionally," and "State those you seldom serve." The answers are given in the table accompanying this article.

In the days of yesteryear, the meat packers' unusual problems seemed restricted mostly to labor and government. But look at the worries today.

Yesterday's profitable products may turn out to be toworrow's obsolete items. For a number of years, the by-products were profitable. Many still are. But some inedible byproducts have been replaced by synthetic substitutes. Take bones as an example. They formerly had numerous uses. Today, they are mostly ground up for animal feed supplements.

Vegetable oils have cut heavily into the use of animal fats. The plastic industry has brought out many items formerly made from animal byproducts.

Other packers' problems have been not of their own making. When government bureaus start regulating agriculture and its products, meat packers automatically have a problem. For several years during World War II and a year after, the OPA's regulations almost wrecked the meat industry. Today, the OPS has the same rules, though different personnel, and the chaos continues and threatens.

During OPA, one large company paid out more than a million dollars in extra expense to satisfy OPA's paper demands. Under OPS, another large national packer spent $200,000 in overtime in one month to an army of clerks and accountants in sorting over old records to satisfy this government body.

And another thing: Is it or is it not a problem to a meat packer who senses that the retail food business is being concentrated in the hands of fewer and stronger outlets. Fewer but bigger outlets would, of course, mean less selling expense.

Low Lard Hogs

Still another problem is finding a market for lard—at today's price. Some packers and other groups closely associated with hog production are experimenting with raising a lighter-weight animal to curtail lard tonnage.

Meat packers, like other food manufacturers, are constantly confronted with the necessity for getting their share of products into the human stomach. Packers, however, have no fears that their products will not rank high in the diet. Recently, the *Monthly Letter* of the National City Bank of New York stated: "People are willing to buy large quantities of red meat, even though on a calorie basis other types of protein foods, such as poultry, eggs, fish, and cheese, are less expensive.

". . . Evidently, the market could absorb much more than last year's estimated production of about 94

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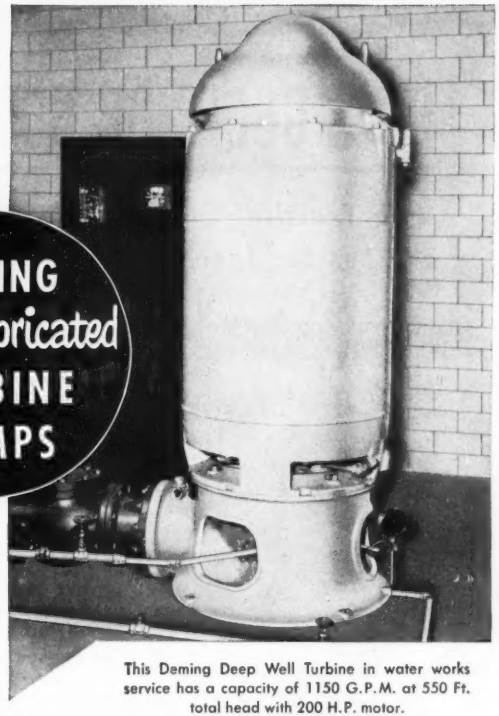
Water Lubricated
TURBINE
PUMPS



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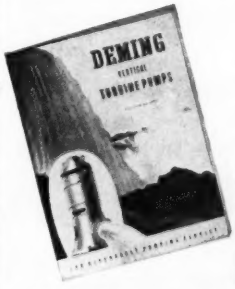

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Pumps are designed for wells 4" to 16" or larger in a full range of capacities from 15 to over 3500 G.P.M.

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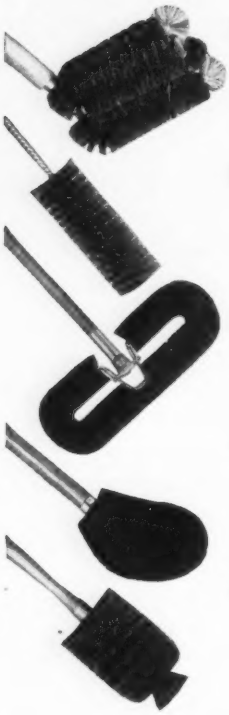

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RADIATOR BRUSH

Ideal for cleaning radiators, registers, bedsprings, and other narrow spaces where an all-round brushing surface is needed. 23″ overall, 6″ brush part, 2¼″ diameter.

WALL BRUSH

Use both sides. Semi-reversible frame. Filled with soft hair for use on any type wall. Cleaning surface 17″ x 6¼″.

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Designed to clean under the rim. Densely-filled, non-absorbent material. Will not retain odors. No exposed metal to mar or chip. In three sizes.

TUMBLER BRUSH

Black bristle mixture on end and stiff black hair on sides. Large end tuft for cleaning bottom of tumbler or bottle. 14″ overall, 6¼″ brush part, 2⅞″ diameter.

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billion pounds of beef. Government figures show that over a period of several decades between 5½ and 6 percent of disposable income has been spent for meat. Since 1937, per capita disposable income increased somewhat more than 2½ times. . . ."

Another problem for packers with plants in river towns is flood damage. One company lost almost $3,000,000 in total flood losses and for protective measures—in just three towns. Because of prohibitive flood insurance rates, most packers do not carry this type of insurance. In the cases of two packers, the flood damage was so big, and the estimated cost to put the damaged plants back into operation so great, that the plan was shelved. Plants with silt to the second story windows are not much of an asset.

Another matter of concern is the increasing number (now about 12,000) of locker plants. Perhaps the packers' concern is not for the 1¼ billion pounds of meat processed by these plants, but for the expansion of their services. Today, a large percentage of locker plants cure and smoke pork, render lard, and provide slaughter service at the farm, at the plant, or elsewhere. And most plants offer chilling, aging, cutting, grinding, wrapping, and sharp-freezing services.

Complex Labor Setup

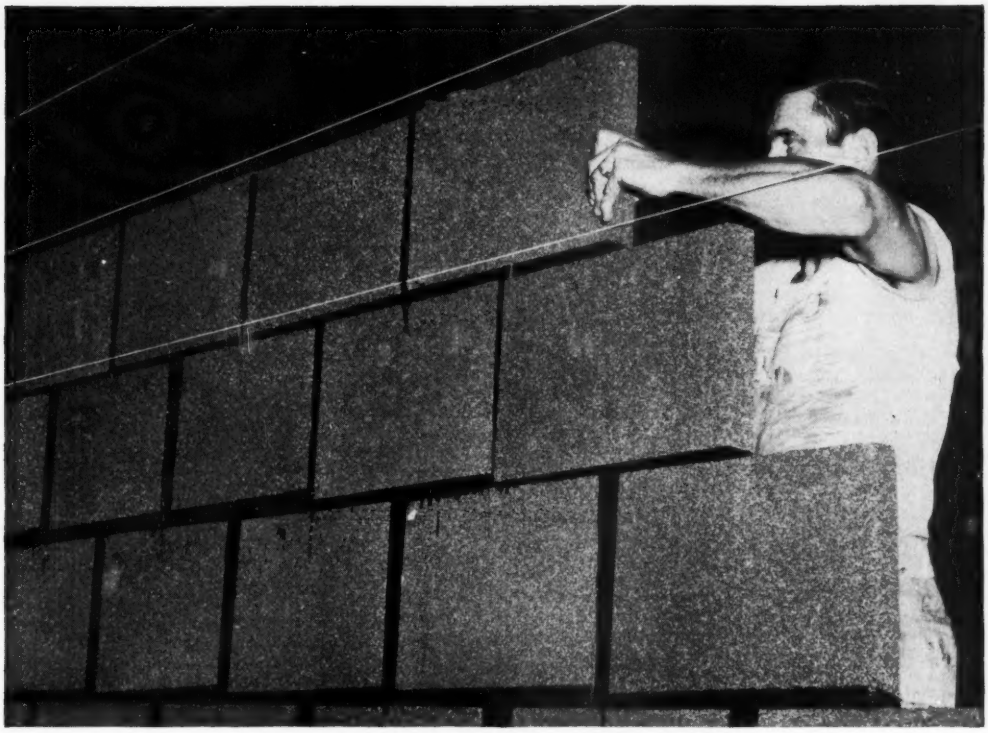
Amicable management relations with employees is vital in the meat field. According to the Bureau of Labor Statistics, an analysis of 50 collective bargaining agreements, representing almost two-thirds of the production workers in meat plants, shows that workers have attained many significant benefits. Ninety percent of the workers in the report are guaranteed a weekly wage, commonly for 36 hr.

Average hourly earnings (including overtime) for meat packing workers rose from 69¢ an hour in 1939 to $1.57 in December, 1950.

The complexity of processing meat into thousands of separate products, combined with great specialization of labor, particularly in large integrated plants, has resulted in an enormous multiplication of separate tasks.

A large plant may have 1,000 or more individual classifications. One of the major companies operates with close to 100,000 separately established work standards. As a result, the wage structure for packers is intricate—matched by few, if any, other fields.

Yes, there are plenty of trends and problems affecting meat packers. And the happiest packers tomorrow will be those who make the proper evaluations and plan the right steps today. *End* (Resume reading on page 95)



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● You've probably seen it happen. With each passing year, refrigeration power costs go up steadily as the insulation efficiency goes down. The stop-gap vapor seals begin to fail, and water vapor begins its steady march through ordinary insulation.

Sometimes the floors and ceilings and walls heave and buckle as the trapped water vapor freezes and expands within the insulation. This is the beginning of the end, and soon the soggy insulation must be ripped out and dumped in the trash barrel.

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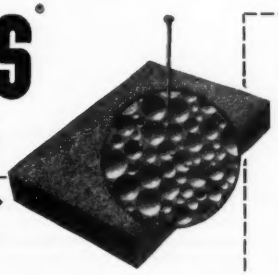

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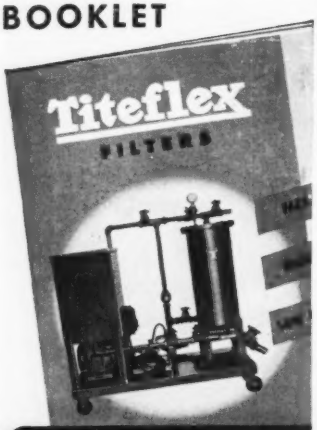

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Questions & Answers

THIS MONTH'S PROBLEM

Question — What can we add to synthetic flavors, such as cherry, strawberry, and raspberry and to lemon and lime oils to reduce their volatility? Trouble with these flavors is that they lose their bouquet when poured on dry sugar formulas.

Answer to July Problem

The Question Was—We are confronted with the problem of increasing evaporator output in our plant, where we have several small multiple-effect units. Would you kindly tell us how we may augment the capacity of this present equipment?

Answer—In the absence of details on limiting factors, such as floor space, available steam, and condenser-water supply, it is difficult to give you a precise answer. Presumably, some such limitation exists to prevent the obvious solution of adding another multiple-effect evaporator in parallel with the present ones.

If space is the limiting factor, it might be possible for you to increase the heat transfer surface in some of your present units, thereby obtaining greater evaporation within the same shell. If your pans are now only heated by jackets, additional surface could also be furnished by installing heating coils. If, on the other hand, they are of the tube type, it is a matter of adding more tubes to the bundle—which is not quite as easy to do.

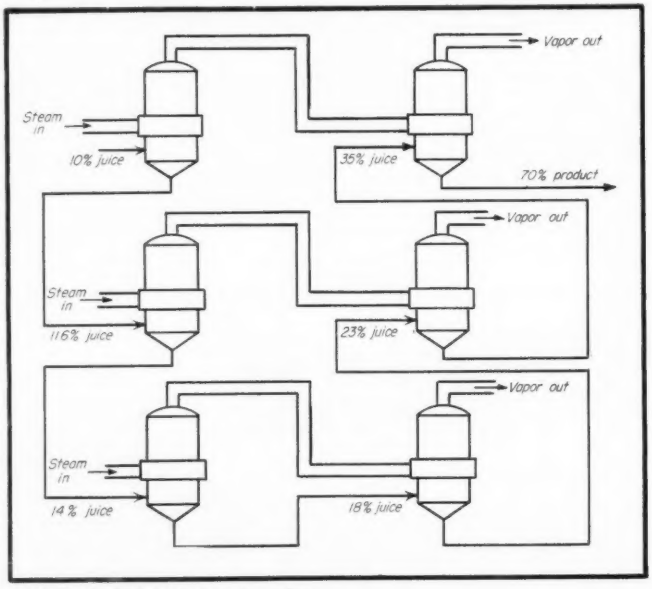
Needless to say, any increase in evaporator capacity so obtained must be balanced by a corresponding increase in condensing capacity. This is accomplished by enlarging the heat-transfer surface or by employing colder cooling water.

We have been advised that evaporator output can be increased 10 percent by another method. Instead of running the multiple-effect units in parallel, hook them up in series (see diagram).

When hooked up in parallel, 10-Brix juice enters the first-effect evaporator, where it is concentrated to 18 deg. Brix. It then emerges from the second-effect evaporator with a 70 percent solids content.

Connected in series, the percent solids content of juice from each evaporator is about 11.6, 14.0, 18.0, 23.0, 35.0, and 70.0.

On the other hand, if you have room for additional equipment but have reached the limit of steam-generating capacity, you might increase the number of effects—going from a double to a triple-effect basis. Thus.



EVAPORATORS hooked up in series.

efficiency in use of steam can be increased. This will reduce operating costs for both steam and condensing water used per lb. of product. However, the capital charges will be increased due to the additional equipment and floor space.

Wants to Cold-Store Cookies

Question—Our busiest season for manufacturing butter cookies and almond macaroons is during the fall and early winter months. These cookies are packed in fancy tins and paperboard cartons. Is it possible for us to make up part of our production during slack months and then store the packaged cookies in a refrigerated room? What temperature and humidity should be used in the cold storage room? And how long will the cookies keep in cold storage?

Answer—Practice has shown that a wide variety of bakery products, including cookies, can be held at 10-15 deg. F. and a 50-55 percent relative humidity for over a year without loss of quality. And there appears to be no danger from "freezing" cookies.

All benefits of storing cookies under refrigeration appears to be accentuated by using lower temperatures. In general, the lower the temperature, the longer is the keeping quality of the cookies.

To avoid the possibility of condensation damage to the paperboard cartons, temper the packaged cookies—remove them from cold storage to a room not more than 40 deg. higher.

One experimental baker informs us that he has kept Brownies in a 38-deg. F. room with the relative humidity at about 55 percent. After two years, members of a taste panel could not detect quality differences between these stored cakes and fresh ones.

Byproduct From Whey

Question—We have been considering converting the whey from our cheese-making operations into crude lactose and would appreciate the following information: (1) How much crude lactose is now being produced in this country? (2) For what is it being mostly used? (3) How much whey would one need in order to make the recovery of lactose a profitable operation? (4) What steps are employed in the recovery of crude lactose from cheese whey?

Answer—We will take up your questions in order.

1. According to USDA Statistical Bulletin No. 105, *Production of Manu-*

You Can Only Guess!

You cannot know the difference between the natural and the imitation by appearance, color or taste... You can ONLY guess!

FLORASYNTH'S *amazing new*

RASPBERRY Imitation SPECIAL

it is rightfully compared to Nature's best... reflecting the sheer skill of our flavor craftsmen in its lasting, highly effective and economical utility...

(Prove its practical advantages to yourself.)

Sample upon request.

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NOW!

EVEN GREATER RESISTANCE TO VEGETABLE OILS

with

BALDWIN SUPERTEX*

*REG. U.S. Pat. Off.

WHITE NEOPRENE

CONVEYOR BELTING

Ever since its introduction Baldwin Supertex has been used by so many of the leading food manufacturers because it is engineered especially for the Food Industry.

Now, Baldwin technicians have developed an improved Supertex by using the new Neoprene WRT in its manufacture.

Supertex has always shown high resistance to vegetable oils. Now it has even greater resistance making it the only belt that meets every requirement of the Food Industry.

Below are six more good reasons why you should specify Supertex whenever you need conveyor belting for your food products.

1. **WASHABLE.** Easily cleaned without removing from pulleys.
2. **TASTELESS.** Food products can be carried directly on the belt.
3. **NON-TOXIC, ODORLESS.** Supertex is safe. It meets all sanitary and health requirements of the food industry.
4. **STRETCHES LESS.** Multiple plies of lightweight close woven duck give added strength with greatly reduced stretch.
5. **LEAVES NO IMPRESSION ON PRODUCT.** Perfectly smooth top cover because it is calendered and press cured.
6. **ACID-ALKALI RESISTANT.** Important in food processing, and in other industries where acid and alkali fumes are present.

Ask now for further information.

Get the facts too on TREAD-TOP for conveying packages up inclines of 25-30 degrees. Write for technical data.

BALDWIN BELTING, INC.
76 MURRAY ST. NEW YORK 7, N. Y.

factured Dairy Products, 1950, crude lactose output totaled 35,252,000 lb. in '50. This was a 63 percent gain over 1949.

2. Principal uses for it are in the manufacture of penicillin, lactic acid, and baby foods.

3. A minimum daily volume of 100,000 lb. of whey is needed to insure a paying operation.

4. Cheese whey is first passed through a cream separator to recover small quantities of butterfat, then concentrated in a vacuum-type evaporator to 55-60 solids and dropped into a crystallizing vat.

The concentrate is cooled to 32-38 deg. F. and permitted to stand, with occasional agitation, until crystallization of lactose is complete. Then the mixture is gravity-fed into basket-type centrifugals. Here, the lactose crystals are washed with cold water and spun at high speed to remove the wash water. The crystals are then evaporated at 175 deg. F. in a tunnel-type dryer. Final product now contains approximately 86 percent lactose.

An improved product can be obtained by neutralizing the whey to about 0.04 percent acidity with sodium hydroxide, then heating to 140 deg. F. and concentrating to 62 percent solids prior to crystallizing.

Treating New Storage Vats

Question—I would like to have details on a method of treating new redwood casks to be used for storing wines.

Answer—Run water into your casks to the 2-ft. mark, then add approximately 100 lb. of sodium carbonate. Next, thoroughly steam the tank for about 30 min. Now, drain the carbonate solution from the tank, rinse, and fill it with water. Finally, add 1

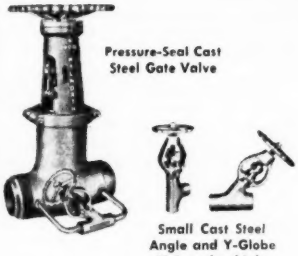
How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



Pressure-Seal Cast Steel Gate Valve

Small Cast Steel Angle and Y-Globe Valves for high-pressure service

Walseal Bronze Strainer

Walseal Bronze Globe Valve

Walseal Bronze Elbow

Walseal Bronze Union End Tee

Walworth is proud to be aboard the S. S. United States

When the United States Lines, the Newport News Shipbuilding & Dry Dock Company, and Gibbs & Cox, Inc., naval architects, join forces to build the fastest, safest and most modern liner the world has ever seen, the selected materials and components have to be top quality. Walworth Pressure-Seal Cast Steel Gate, Globe, and Angle Valves, and Walworth Small Cast Steel Angle and Y-Globe Valves for high-pressure service are installed in the main steam lines of the S. S. United States. Brass and copper lines use large numbers of Walseal valves, fittings, strainers, and unions.

Knowing that Walworth valves and fittings are a vital part of the power arteries aboard this great ship, the proudest moment of Walworth's 110 years of manufacturing experience came when the new Queen of the Sea broke both the east and west trans-Atlantic speed records.

As we present our compliments to Commodore Manning and his crew, to the Newport News Shipbuilding & Dry Dock Company and its men, and to William F. Gibbs and his staff, we also compliment the men and women of the Walworth Company who gave of themselves to put quality into our products and this quality ship.

WALWORTH

valves • fittings • pipe wrenches

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Niagara's HYGROL DRIES AIR BEST

with exact moisture content

- to control your product's quality
- to prevent condensation on your product or material
- to prevent changes due to moist air in contact with your product
- to protect your material from dampness
- to protect your processing of moisture-sensitive material
- to DRY your material or product
- to pack or store your product safe from moisture damage
- to get exact moisture control for the precise atmosphere condition you need
- to provide precise atmospheric conditions for testing
- to increase your air conditioning capacity
- to DRY large quantities of fresh air from outdoors

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

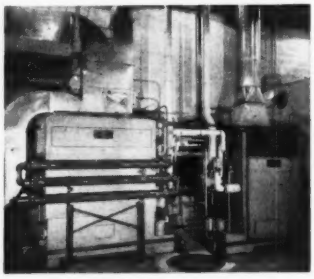
Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.



Niagara Controlled Humidity Air Conditioning

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

For complete information write

NIAGARA BLOWER COMPANY

Dept. FI, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

gal. of concentrated sulphuric acid to each 5,000 gal. of water. Let stand a week or more.

Precaution: Water should not be added to sulphuric acid. For the acid will sputter, and may seriously burn the man handling the job.

Has a Corrosion Problem

Question—On our mayonnaise and salad dressing line, we employ 18-8 molybdenum stainless steel (Type 316) equipment, which reportedly is best for handling our products. Yet, our equipment shows some tendency toward pitting. Have you any suggestions on preventing this?

Answer—Pitting can be minimized by keeping all stainless steel surfaces highly polished and by cleaning the surfaces after each use to remove salty solids.

We know of one processor who has obtained good results by delaying the addition of salt to his products. Only after all the other ingredients are thoroughly mixed and ready to go to the homogenizer is the salt introduced. As a result, the time that the stainless steel surfaces must resist attack by the corrosive salt-vinegar mixture has been substantially reduced.

Making Soy Sauce

Question—We've been advised that a mold-enzyme culture method is employed in the manufacture of a superior quality soy sauce. If so, do you have detailed information on the preparation of such a product?

Answer—Hydrolysis of soybean protein by fungal enzymes (proteolytic and diastatic) under proper conditions gives rise to end-products that provide a sauce with marked organoleptic properties. Chief among these products is monosodium glutamate. Other ingredients of soybean hydrolyzates possess the so-called meaty flavors.

Such a sauce is very palatable. It consists of a mixture of amino acids, peptides, polypeptides, peptones, simple proteins, purines, carbohydrates, and other organic matter, suspended in an 18 percent salt solution.

To produce the sauce by the mold-enzyme method, soak soybeans about 20 hr. in cold running water. Next, cook the beans until they are soft, either by autoclaving 50 min. under 15 lb. pressure or by boiling in an open kettle for a longer period. Cooked beans are then drained and cooled as rapidly as possible.

Wheat grains, the next major ingredient, are uniformly roasted in a large open iron pan, then cooled and

Advance-Design

CHEVROLET TRUCKS

These PLAIN HARD FACTS are important to economy-minded truck buyers

first in demand in value in sales

CHEVROLET

Fact No. 1

CHEVROLETS LIST FOR LESS

First cost—the list price—is less for a Chevrolet than for any comparable truck capable of handling the same payload. Chevrolet's position as the world's largest manufacturer of trucks makes possible production savings that are passed on to you.

Fact No. 2

COST LESS ON THE JOB

Proved Chevrolet truck features save money over thousands of miles. Time-tested Valve-in-Head engines, rugged hypoid rear axles, extra-sturdy channel-type frames, Flexi-Mounted cabs, Ball-Gear steering, Synchro-Mesh transmissions, all contribute to low operating costs with high dependability.

Fact No. 3

EACH TRUCK TAILORED TO ITS JOB

Every Chevrolet truck is *factory-matched* to the job it's going to do. Tires, axles, frame, springs, engine, transmission, and brakes are right for the operating conditions and load. Whatever your job is, there's a Chevrolet truck to fit it.

Fact No. 4

WORTH MORE AT TRADE-IN TIME

Chevrolet trucks traditionally bring more at resale than other makes costing about the same when new. Chevrolet trucks keep their value longer and give you real, substantial savings right up to the day you sell them. See your Chevrolet dealer soon.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

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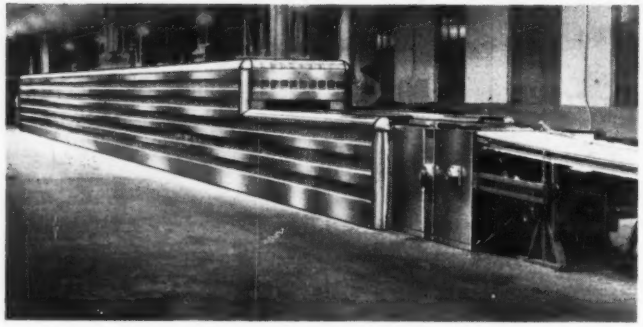
Advance Ovens and Conveyors

for BAKING • TOASTING • HEATING • DRYING • STERILIZING

APPROVED BY BAKERS FROM COAST TO COAST

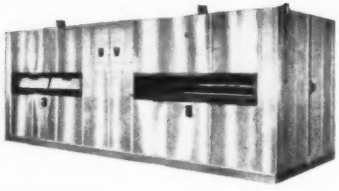


• ADVANCE TUNNEL OVENS AND CONVEYORS—with Advance-Design features that mean increased production at lower cost:

- Controlled Top and Bottom Recirculated Heat.
- Direct or Indirect Firing (Oil, Gas or Electricity).

Conveyors of Swedish steel or wire mesh band. Chain and roller drive. Electronic self-aligning design.

• ADVANCE REVOLVING OVENS—Uniform production, loaf after loaf. Capacities from 96 to 192 loaves. All-steel and aluminum construction with drop-type doors, safety pilots, electric ignition. Choice of stainless steel, porcelain or aluminum exteriors.



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ADVANCE

OVEN COMPANY

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MANUFACTURED IN CANADA BY FORT ENG. & SALES, LTD., MONTREAL

crushed. Powdered wheat and sterile cooked soybeans are now blended—1 part wheat to 2-3 parts beans. This mixture is then inoculated with spores of the mold, Aspergillus flavus.

This inoculated mass is now spread in 2-in. layers in wooden or metal trays, and incubated 2-3 days at 77-86 deg. F. Trays must be arranged to permit adequate circulation of air around them.

Within 18-24 hr., the temperature of the inoculated substrate rises and a heavy mycelial growth appears. When the mold has developed sufficiently, the soybean culture is stirred to bring material at the bottom of the trays to the surface. At no point during incubation should the temperature go above 95 deg. F.

About 40 hr. after inoculation, the culture is introduced into a deep, sterile container and brine is added—2 lb. of salt per gallon of brine. A gallon of brine is used for every 5 lb. of soybeans (based on initial weight).

The mash is then allowed to ripen 6-8 weeks at 120 deg. F. Finally, the sauce liquor is strained and pressed from the mash, heated almost to boiling for 20 min., clarified, and bottled.

Servicing Batteries

Question—Can you suggest a good routine practice for servicing storage batteries in our shop?

Answer—Charging and watering can be easily carried out by following a definite routine that dovetails with the working periods of the batteries. During this schedule, make test-fork readings (check the charge of each cell) and put on the charger.

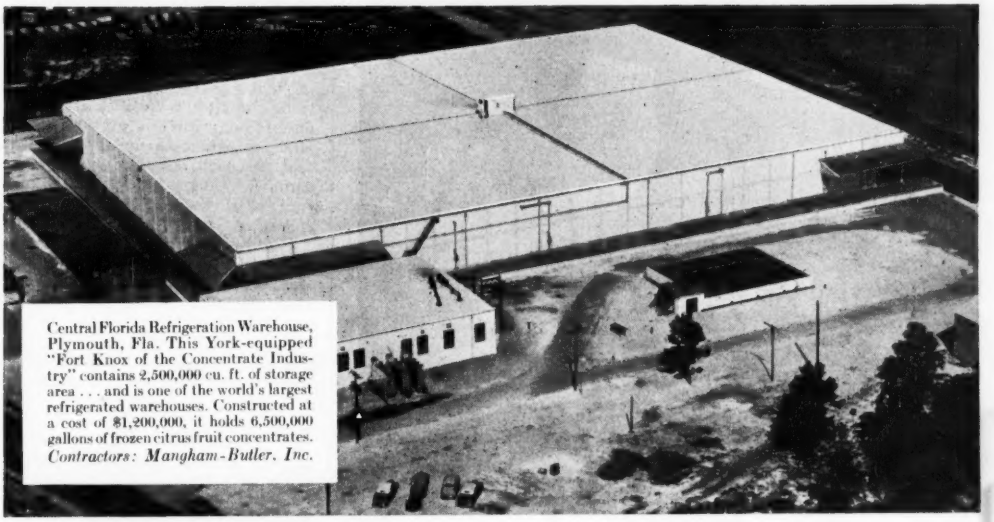
In setting up a routine, time the charging immediately before the daily work period of the batteries. Assume that a battery is used for an 8-hr. work period, then 16 hr. remain for charging. Now let the battery stand idle for the first 8 hr. of the 16-hr. period. Take test-fork readings and charge the battery during the second 8-hr. period.

By permitting a battery to stand idle for 8 hr., it will have sufficient time to cool before being put on charge. Furthermore, the ½-hr. wait necessary for accurate test-fork readings will automatically be insured.

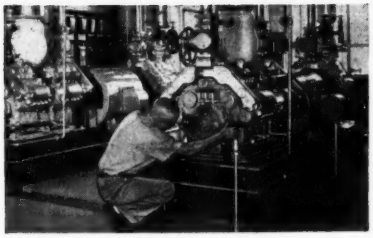
If necessary, a battery can be watered at the same time test readings are taken. Or, the battery can be watered any time during the idling period.

How often a battery must be watered will depend upon the capacity used each day. However, every battery must be watered often enough to prevent the electrolyte solution in a cell from falling below the recommended level.

at Florida's "Fort Knox"
YORK chills "Liquid Gold" to Subzero Temperature



Central Florida Refrigeration Warehouse, Plymouth, Fla. This York-equipped "Fort Knox of the Concentrate Industry" contains 2,500,000 cu. ft. of storage area . . . and is one of the world's largest refrigerated warehouses. Constructed at a cost of $1,200,000, it holds 6,500,000 gallons of frozen citrus fruit concentrates. *Contractors: Mangham-Butler, Inc.*



A constant temperature of −10°F. is maintained by 3 York highspeed V/W Refrigeration Compressors at the Plymouth, Fla. plant.

Whatever your product or production quota may be—whatever the size of your plant—you'll profit from these dollar-saving features of York V/W Refrigeration Compressors: 72% power savings at 25% load, and a flexible load capacity which permits you to schedule your work-hours to fit your product load. Many other York features you can't afford to overlook are listed in the panel below.

To further aid you in lowering cooling costs, York provides on-the-job assistance via a nationwide network of Branch Offices—staffed by York-trained specialists in every phase of industrial cooling. Your nearest York Branch Office is as near as your telephone. Call them today or write direct to York Corporation, York, Pa.

THE WORKHORSE OF THE INDUSTRY

low **operating costs** *Reduced starting power requirements. * Pressure lubrication. * Minimum friction with packless shaft seal. * Vibration-free operation with static and dynamic balance. *Valves pinned to prevent wear.

low **maintenance costs** *York V/W Refrigeration Compressors can't wear out—all wearable parts are quickly and easily renewable.

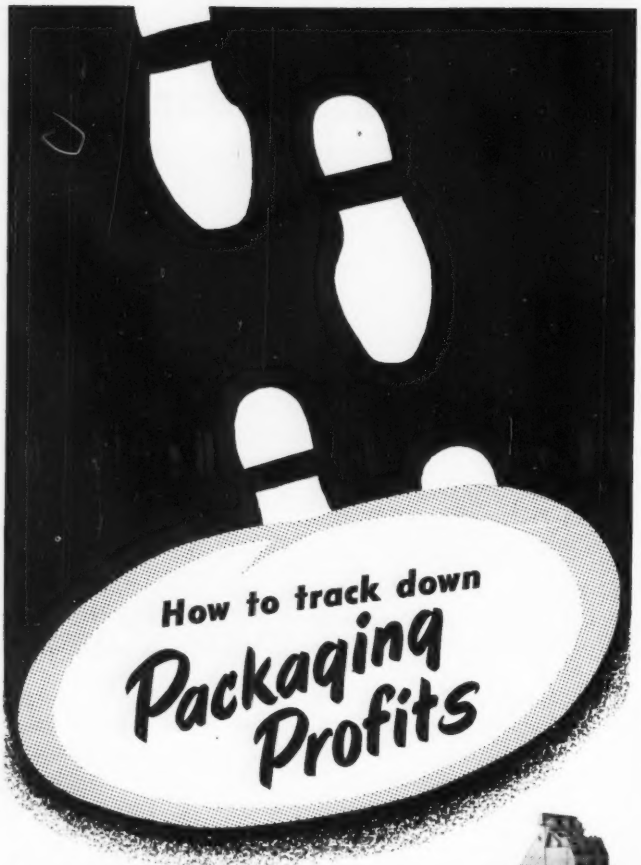
low **initial costs** *You pay only for the machine capacity you need. York V/W Refrigeration Compressors are available in 4, 6, 8, 12, 16 cylinders . . . ranging from 5 to 300 tons. Adaptable to booster and high-stage operation.

low **installation costs** *No special foundations needed. *Ideal for upper floor mounting. *Minimum area and headroom needed for installation.

York refrigeration air conditioning

THE BIG ADVANCES COME FROM **YORK**

HEADQUARTERS FOR MECHANICAL COOLING...SINCE 1885



Investigate TRIANGLE Equipment for new *cost-saving* advantages

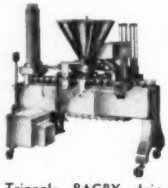
On installation after installation, Triangle has effected 20% to over 60% savings in time, manpower and effort . . . with the use of machines like the Triangle ELEC-TRI-PAK, auger packer, net weighers and other dry or semi-viscous product fillers.

Pay as you Package

Your new Triangle equipment pays for itself—out of profits you earn. Besides, you may use the valuable Pay-As-You-Package Plan when you install Triangle equipment.

These are unusually good reasons to investigate Triangle methods and machines *today*.

Triangle ELEC-TRI-PAK reduces costs up to 60% or more.



Triangle - BAGBY dairy filling equipment cuts costs in half.

TRIANGLE Package Machinery Co.

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Sales Offices: New York • Newark • Boston
Baltimore • Atlanta • Dallas • Denver
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Grapefruit Beverage Process

Question—Recently, we have been approached by several southern distributors who seek a high quality carbonated grapefruit beverage. Can you furnish me with a formula and detailed instructions for preparation of this type beverage?

Answer—To make a bottler's concentrate or syrup, introduce the following into a mixing tank equipped with vertical agitator: Sweetened grapefruit juice (15 deg. Brix), 5 gal.; cane sugar, 50 lb.; grapefruit-oil emulsion (20 percent oil), 12 fl. oz.; citric acid, 23 oz.; naringin (a bitter glycoside of grapefruit), ¾ oz.; sodium benzoate, 3¼ oz.; and water, 3¼ gal.

Dissolve and thoroughly mix ingredients. Ship in metal drums.

For making the beverage, add 3 fl. oz. of concentrate to 12-oz. bottles, and then introduce carbonated water.

Each 12-oz. bottle contains: Grapefruit juice, 10 percent; citric acid, 0.025 percent; grapefruit oil, 0.04 percent, and naringin, 1 in 10,000 parts.

Changes in the sweetness or tartness of the beverage can be made by altering the sugar and acid contents of the concentrate.

Shipping Fish and Meats

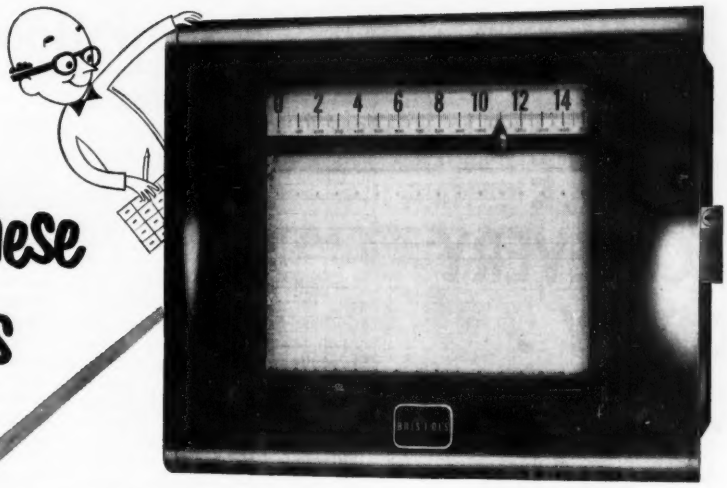
Question—We ship fresh fish into the interior in refrigerated trucks, and would like to bring back fresh steer carcasses on the return trip. However, the meat picks up objectionable fish odors, even though we thoroughly wash the trucks. We think the solution to our problem might be wrapping the carcasses in odor-proof plastic bags. Have you any suggestions?

Answer—After you cleanse your trucks with hot water, thoroughly scrub their interiors with 12 percent ammonia water, then follow with a 12 percent vinegar solution.

For many years, odor-proof, synthetic-rubber latex bags have been successfully used for wrapping meats, fish, poultry, and other irregularly-shaped foods. And some meat packers have wrapped entire side of beef in them.

These bags are expanded with compressed air, and then drawn over the carcasses. About 10-15 in. of vacuum is pulled mechanically, and the bag opening is heat-sealed. Finally, the wrapped carcass is immersed in warm water, and the bag immediately shrinks and adheres snugly to the product.

You might also look into the possibility of wrapping your carcasses in polyethylene bags. Poultry and meat packers are finding success in using this type of odor-proof plastic film for their products.



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OF THE

BRISTOL DYNAMASTER FOR TEMPERATURE pH and SPEED

—the electronic master-mind for your measuring, recording and controlling problems

- ✓ Continuous-balancing electronic circuit responds instantly to minute changes
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FOR DETAILED PROOF *of the sensitivity, versatility and reliability of the electronic Dynamaster, use the coupon or write for Catalog P1245.*

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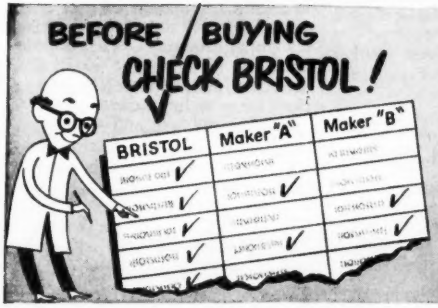
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



THE BRISTOL COMPANY
115 Bristol Road
Waterbury 20, Conn.

Please send catalog giving details of Dynamaster performance to:

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COMPANY _____

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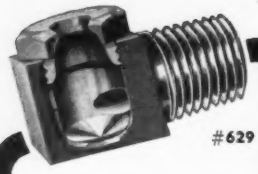
For more information, use post card on last page.

THERE'S A MONARCH NOZZLE FOR EVERY SPRAY JOB



#629

In many Food Processing plants Monarch Spray Nozzles are used to . . . .

Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

MONARCH MFG. WKS., INC.
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Useful New Books & Government Publications

Food Price Primer

AGRICULTURAL PRICES. *By Frederick L. Thomsen and Richard J. Foote. Published by McGraw-Hill Book Co., Inc. 330 W. 42nd St., N. Y., 1952. 509 pages; 6 x 9¼ in., cloth. Price $6.50.*

Compiled here are voluminous facts to (1) Prepare the reader to interpret agricultural price situations and problems in relation to planning production, selling, or purchasing and, (2) enlarge his understanding of agricultural conditions, price theory, and statistical methods of dealing with economic problems of agriculture.

Of note is the discussion on government price programs and their effect on free competition. The authors take the position that numerous misconceptions have arisen due to *apparent* success of these programs. They point out factors existing beyond the programs and exerting favorable influence upon them. They feel these factors lead to "false economy" thinking.

There is an excellent chapter on price forecasting and preparing outlook reports.

Patents Explained

PATENTS FOR TECHNICAL PERSONNEL. *By Dr. Worth Wade. Published by Chemonomics, Inc., 400 Madison Ave., N. Y., 1951. 40 pages; 6 x 9 in., paper. Price $3.00.*

Presented here is a practical guide on patents for technical students and laboratory personnel. How to recognize an invention is one fundamental aspect covered. And there are many facts on processing patents.

Among unusual features are flowsheets showing steps taken in converting an idea into a patent application. Safeguarding of the application is likewise considered. And ways to save steps and avoid duplication are included, as well as rights of employers and employees concerning inventions.

The author is at present a member of the Committee on Patents for NAM.

Relevant Chemical Work

MODERN CHEMICAL PROCESSES, VOL. II. *Published by Reinhold Pub. Corp., 330 W. 42nd St., N. Y., 1952. 299 pages; 8¼ x 11¼ in., cloth. Price $5.*

Aim of this current, well-illustrated volume is to provide an inventory of chemical technology and a reference source; moreover, the role of chemicals in food is given significant stress wherever applicable.

Food men directly concerned with the information are wine makers, brewers, sugar refiners, and yeast producers. In addition, there are chapters for those who deal with edible oils and chemicals derived from fats.

Flowsheets depicting plant processes are an added feature.

The reader will note that the text maintains a high scientific level, yet there is also broad perspective through inclusion of many varied factors which give further framework to descriptions of particular industries.

For instance, the effect of the past war on various industries and the disposition of foreign plants confiscated during that period are noted. Meanwhile, the technical path of the text is maintained.

Fertilizers and Water

PHOSPHORIC ACID, PHOSPHATES AND PHOSPHATIC FERTILIZERS. *Second Edition. By William H. Waggaman. Published by Reinhold Publ. Corp., 330 W. 42nd St., N. Y., 1952. 683 pages; 6 x 9 in., cloth. Price $15.*

Technology and uses of phosphorus are chief criteria in this highly comprehensive study, with applications in the food industry well related.

To food plants obtaining raw product from their own fields and those plants with indirect command over sources, sections of volume on phosphatic fertilizers will prove invaluable. Aside from presenting reasons for using concentrated fertilizers, the text discusses various problems and methods of combatting them.

Water softening and the use of phosphates in cleansing also have direct relation to the food processor. In addition, a specific chapter treats of phosphates in the manufacture and refining of cane sugar. Here are outlined uses of phosphatic materials as defectants and clarificants, from ancient times to the present.

Finally, the appendix includes a complete list of U. S. Patents pertaining to the manufacture and use of phosphorus compounds.

Front-Office Guide

THE DEVELOPMENT OF EXECUTIVE TALENT. *Edited by M. Joseph Doo-*

her and Vivienne Marquis. *Published by American Management Assn., 330 W. 42nd St., N. Y., 1952. 576 pages; 6¾ x 9¾ in., cloth. Price* $6.75 ($5.75 *to members*).

Companies offering or contemplating programs of executive development will be wise to read this latest, authoritative volume on the subject.

Forty-four authors are contributors. They offer a working blueprint describing the principles and tested practices for many types and sizes of companies. Underlying premise is that from sound executive training is derived good management. Thus, this handbook provides specific, practical guidance on all problems involving planning and administration of an executive development program.

Detailed are patterns of action in meeting problems that have found favor among keen practitioners in the field. Varied case studies enhance the value of the work.

Government Publications

MARKETING OF NONDRYING INDUSTRIAL FATS AND OILS AS AFFECTED BY PROCESSING METHODS. *U. S. Dept of Agriculture; Production & Marketing Admin., Fats & Oils Branch. Issued 1952, 44 pages.* Begins with description of fats and oils industry and discusses processing methods. Continues on methods to obtain, purify, and separate fatty acids. Concludes with words on fatty acid derivatives.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

MILK FOR THE FUTURE AND HOW TO GET IT. *U. S. Dept. of Agriculture, Bureau of Dairy Industry. Issued 1952, 9 pages.* Data on milk yields over varied periods lead into a discussion on methods for increasing quantity and quality. Better yield methods are targeted in special 1975 projection on feeding of the average dairy cow.

COTTONSEED OIL MILL CHARACTERISTICS AND MARKETING PRACTICES. *U. S. Dept. of Agriculture, Bulletin 79. Price 25c.* Analyzes operating practices of cottonseed oil milling industry, with variations in practices related to variations in costs and other economic factors. Study is based on data provided by Bureau of Census.

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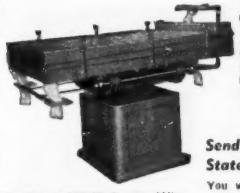

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Can Shortage Threat Believed Over

There will be no serious loss of perishables because of a can shortage if everything goes as planned. Action by defense agencies to channel available metal containers to packers of perishables ended the threat in early August, in the opinion of Secretary of Agriculture Brannan.

Yet the Secretary admitted that some spot shortages of cans might develop. And he requested Agricultural Mobilization Committees to maintain vigilance throughout the canning season and investigate any threats of shortage.

According to Can Manufacturers Industry Advisory Committee, there had been no appreciable losses up to Aug. 6, and the remaining crops would be taken care of, although there might be a few spot dislocations.

NPA ordered all hot-dipped tinplate produced through Aug. 15 to be used for cans and closures to pack perishable foods.

F&DA on Fluorinated Water

According to a statement in the July 23 issue of the *Federal Register*, the Federal Security Agency will not regard water supplies containing amounts of fluorine within the limitations recommended by the Public Health Service, as grounds for action under the Federal Food, Drug & Cosmetic Act.

Similarly, foods commercially prepared with such water will not be regarded as actionable under Federal Law unless a significant amount of fluorine is concentrated from the water during processing.

In the latter instance, the facts with respect to the particular case will be controlling.

The complete policy statement of F&DA will be found on page 6732 of the July 23 *Federal Register*.

Cobalt Bests X-Rays

Among the various means of sterilizing a product by radioactivity, the use of cobalt-60 has been found superior by Armour Research Foundation of Illinois Institute of Technology.

Research on drugs indicates that X-rays, beta rays, ultraviolet, high-energy electron bombardment, and radioactive slurry either have commercial disadvantages, or don't do the job as well.

The conclusion is that cobalt-60 promises to combine simplicity of sterilization, efficiency, and economy.

Sterilization of foods with radioactive cobalt is being investigated by at least one large food processor.

Atomic Food Analysis

Atomic energy has been used to detect and measure impurities in foods and other products by Union Carbide scientists at Oak Ridge National Laboratory. And the new analysis technique is being offered as a service to industrial, scientific, and medical organizations.

The sample to be tested is exposed to neutron bombardment in the Oak Ridge reactor, or "atomic furnace." In this way, traces of impurities are made artificially radioactive. Then highly sensitive instruments measure with great accuracy the exact quantities of impurities present.

Several advantages of the method are reported. It detects and measures slight traces of chemical elements. It can be more specific than other techniques. And possibility of contamination is negligible.

Food Supplies Ample For Remainder of '52

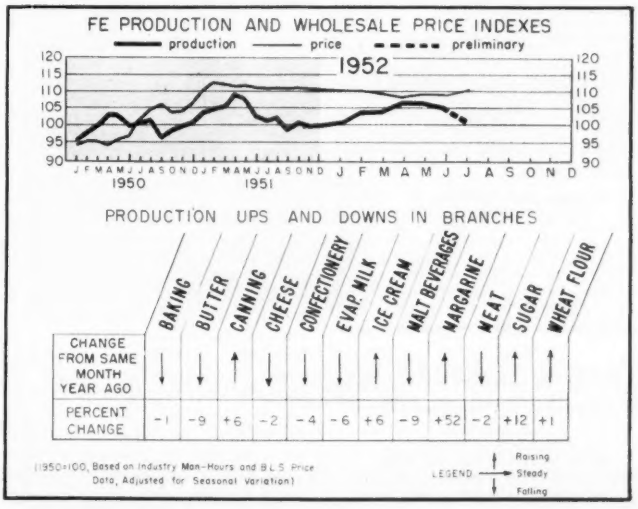
As plentiful food supplies for domestic consumption as were enjoyed in the comparable period last year are now expected for the remaining months of 1952, according to midyear reports on crop and livestock production and on stocks.

Prospects for output as of July 1 add up to a slight increase in overall food production compared with 1951, reports the Bureau of Agricultural Economics, USDA. The gain will come principally from slightly larger marketings of poultry products and beef and veal and larger crops of wheat and rice. But this increase will be about offset by the gain in population.

Good supplies and strong consumer demand are seen by the Bureau as pointing to some increases over the second half of '51 in per capita consumption of beef and veal, turkey, fluid milk, margarine, shortening, frozen fruit juices, fresh peaches, canned and frozen vegetables.

On the other hand, somewhat less pork, manufactured dairy products including butter, some fresh and processed fruit, and sugar are likely to be taken per person.

During the next few months, military takings will be at about the same overall rate as late summer and fall.



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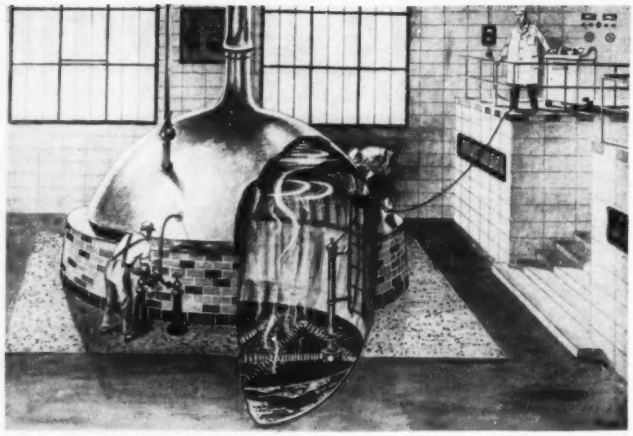

Ultrasonic Extraction

Ultrasonic extraction of the bitter components from hops has been developed by Ultrakust Geratebau, Ruhmannsfelden, Bavaria. Already adopted by several breweries, the method results in a 40 percent saving of hops.

The equipment consists of a high-frequency generator and a supersonic element mounted on a column up to 3 meters long. This column is dipped into the float of hops in the brew kettle.

Thus transmitted to the hops, the supersonic waves generate, at intervals of 1 mm., stresses of more than 5 atmospheres. And the pressure changes its direction one million times a second.

This results in destruction of the cell structure of the hops to achieve speedy extraction of the bitter components.

Illustration shows supersonic element in brew kettle and high-frequency generator on adjacent platform. Six quartz vibrators are installed in hexagonal head at end of element in kettle.

though there will be shifts among items. Foreign trade is likely to run lower. Some decrease in net exports is expected due to the improved food situation abroad and the continued shortage of dollar exchange.

Somewhat higher costs of processing and marketing, continued high consumer demand, and seasonal changes in supplies might bring about a slight upward movement in retail prices.

New Vitamin?

What may prove to be a new vitamin has been uncovered at the USAD's poultry nutrition laboratory at Beltsville, Md.

Discovery was that a fish-solubles concentrate contains a factor that promotes rapid growth in young chicks, even when fed all known nutrients.

The new factor has now been found in fish meal, and meat meal, as well as fish solubles—the only important sources among commonly used feedstuffs. Results of experiments justify the use of these animal by-products, but a search for other likely sources has revealed that the factor is produced by certain microorganisms. Production through employment of these microorganisms may be found commercially feasible.

Home Freezers Save Time Rather Than Food Dollars

Convenience—rather than reduced food bills—may well be the note stressed in future home freezer sales.

This is the hint offered in a report by the USDA, following a cooperative study in which the Production & Marketing Administration and College of Agriculture of the University of Arizona sought views of Tucson and Phoenix homemakers regarding economics in freezer use and buying practices.

In Tucson, owners reported a 12 percent saving in shopping and food-preparation time. But in purchasing frozen meat and commercially frozen fruits and vegetables in quantity, actually little or no savings were made in food bills as compared with families not owning freezers.

True, freezing of *home*-grown commodities was found more economical, also the buying and freezing of fresh foods in season when prices are lowest. But neither of these alternatives were attractive to the homemaker on the score of convenience, and both require time and work for processing and packaging.

In Phoenix, 79 families reported were found to have "freezer-stored" an average of 861 lb. of food per year.

Of this 60 percent was meat, poultry, and fish; 13 percent dairy products (mostly ice cream); 11 percent fruits; 9 percent vegetables; and 7 percent miscellaneous items. Of the total, 40 percent was frozen at home, 30 percent at locker plants, and 30 percent in other commercial plants.

Improved Banana Puree

Development of a new method of canning banana puree, stated to eliminate the brown or pink discoloration in the processed product and preserve natural flavor, is announced by Continental Can Co.

This discoloration, it was found, was caused principally by enzyme activity, hence Continental researchers went to work on the problem of inactivating the enzymes. And their investigations then disclosed that the discoloration is eliminated by blanching whole, peeled bananas in hot water, steam, or a combination of both, for 6 or 8 min. or to a center temperature of 190 deg. F. The whole bananas are then pureed in a conventional finisher or comminutor.

In addition, the researchers found it necessary to adjust the pH and sugar content of the natural fruit because of varietal differences, maturity, etc. Citric acid brings the pH to a range of 4.1 to 4.3 to permit low temperature sterilization, and sugar content is made 30 to 40 percent to enhance flavor. The banana puree is then flash pasteurized to a temperature of approximately 200 deg. F., filled and sealed into cans, and subsequently cooled.

New Extraction Method

Vacuum filtering in a horizontal rotary unit is employed for direct solvent extraction of a variety of seed oils in a new process announced by Blaw-Knox Co., Pittsburgh.

Resulting from work at the Southern Regional Research Laboratory of USDA, the process is said to be particularly suited to the small cottonseed processor. It offers him a method which utilizes conventional equipment for linting, hulling, rolling, and cooking—yet provides the advantages of direct solvent extraction of a variety of oil seeds.

"Locked-In" Meat Flavor

A new formula, calling for use of disodium phosphate in cooking hams in preparation for canning, is reported preventing loss of moistures and nutrients, and thereby flavor. Developed by G. Brissey, chemist of Swift & Co.,

Candy Sorted Automatically

● Undersized or misshapen pieces of candy called "cripples" fall through the mesh of this Cyclone spiral conveyor belt. Only properly-sized and perfectly-shaped candies remain on the belt to be carried to the packing tables. All manual sorting of candy is eliminated—reducing both time and cost of production.

Whatever size candy you may produce there is a Cyclone belt of the right gauge to fit your operation. (Illustration shows four actual mesh sizes.) And other Cyclone belts—Chain Link, Flat Wire and Flex-Grid—are available for many types of food plant conveyor problems. For more examples and information write for our free catalog No. 4. Address: Cyclone Fence, Dept. H-92, Waukegan, Illinois.

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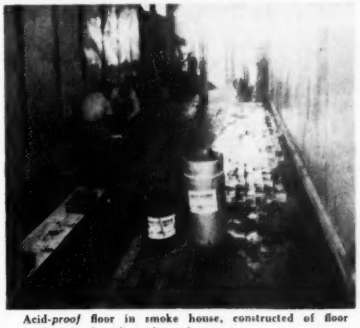

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Grade Standards Offices Named by USDA

Official inspection of processed fruits and vegetables and a number of related products (including honey and maple syrup) can be arranged at any of 33 regional offices of the Department of Agriculture. As of July 1 the following locations were listed by the Processed Products Inspection Div., Fruit & Vegetable Branch, Production & Marketing Administration, USDA:

Office	Address	Telephone
Eastern District		
Washington 25, D. C.	Processed Products Standardization & Inspection Div., Fruit & Vegetable Br.	Republic 4142 Exts. 4693–4694
Atlanta 3, Ga.	Rm. 353, 50–7th St., N. E.	Elgin 3311, Ext. 5129
Baltimore 2, Md.	307 Appraisers Stores Bldg.	Plaza 8460, Ext. 694
Boston 10, Mass.	725 Appraisers Stores Bldg.	Hancock 6-0135 Exts. 51, 52
Easton, Md.	32 East Dover St. (Mail, PO Box 762)	Easton 1066
New York City 14	Rm. 854, 641 Washington St.	Watkins 4–1000, Exts. 216, 217
Philadelphia 6	601 U. S. Customs House, 2d & Chestnut	Market 7–6000, Ext. 35
Portland 3, Me.	Rm. 18, U. S. Customs Bldg.	Portland 4–8381
Richmond 19, Va.	1200 East Main St.	3–9033
Rochester 14, N. Y.	300 Terminal Bldg.	Locust 7450
Winter Haven, Fla.	Rm. 216 Florida Citrus Bldg. 3rd St., N.W. (Mail, PO Box 860)	29–232 & 29–751
San Juan, Puerto Rico.	Processed Foods Inspection, P&MA PO Box 2512	2–2120, Ext. 31
Central District		
Cedar Rapids, Iowa.	206 Federal Bldg.	3–2951
Chicago 7	1020 U. S. Customs House, 610 South Canal St.	Harrison 7–6910, Exts. 251, 252
Columbus 15, Ohio.	39 Old Federal Bldg.	Maine 6411, Ext. 433
Detroit 9	Rm. 36, Detroit Union Produce Term., 7201 West Fort St.	Vinewood 1–1926 or Vinewood 1–0466
Fayetteville 5, Ark.	320½ West Dickson St. (Mail, PO Box 38, University Station)	Fayetteville 586
Hammond, La.	Southeastern College Campus (Mail, PO Box 151, Hammond)	Hammond 263
Indianapolis 25, Ind.	Rm. 527 Postal Station Bldg., 352 So. Illinois St.	Lincoln 9844
Knoxville 7, Tenn.	Rm. 202, Food Science Bldg., U. T. Farm	4–2981, Ext. 79
Ripon, Wis.	U. S. Post Office Bldg. (Mail, PO Box 96)	Black 540
Weslaco, Tex.	245 South Texas Blvd. (Mail PO Box 102)	Weslaco 76
Western District		
Denver 2, Col.	553 U. S. Custom House	Keystone 4151
Fresno 3, Calif.	1630 LaSalle Ave.	Fresno 4–5971
Los Angeles 15.	Rm. 351 Bendix Bldg., 1206 Maple Ave.	Prospect 9323
Portland 5, Ore.	312 U. S. Court House	Atwater 6171
Salem, Ore.	530 Glen Creek Drive	Salem 3–3002
Salt Lake City 1, Utah	B-45 State Capitol Bldg.	4–2515, Ext. 292
San Francisco 3	223 Old Mint Bldg., 5th and Mission Sts.	Underhill 1–2428, Exts. 7, 8
San Jose 10, Calif.	670 Stockton Ave.	Cypress 5–7600
Seattle 1, Wash.	1917—1st Ave. Rm. 207 Alaska Trade Bldg.	Seneca 4133
Stockton 5, Calif.	1281 North Ophir St.	Stockton 7–7269
Yakima, Wash.	212 Liberty Bldg.	Yakima 2–3381

the new patented process has met with the approval of the Bureau of Animal Industry.

Already, several Swift and associated plants have adopted the process. And it is stated others will follow until all company units will give hams and canned chopped meats, such as Prem, the disodium phosphate treatment.

Dry Milk Record

Estimated production of spray-dried nonfat milk solids for June was 85,250,000 lb., highest on record for this month. Total nonfat dry milk was 116,900,000, a gain of 8 percent over 1951, and 13 percent over the 5-yr. average.

Food Packaging Problems

Part of the Food Seminar of the 14th Annual Forum of Packaging Institute, Oct. 20-22, at Hotel Commodore, N. Y., will be a discussion on what a package should accomplish. Often food processors are importuned by non-technical salesmen as to what they want in a package. Yet while a company with a well-staffed packaging laboratory may know its wants, too often nobody is certain of the technical requirements.

Another feature of this seminar will be a report on rancid flavors. Rancidity may develop in the food itself, or fats may leak into the package, where rancidity may then occur. In turn, the product absorbs the rancid flavor

from the package, and thus loses quality even though it has not undergone deterioration.

Also to be discussed will be caking of free-flowing powders, as well as the important double problem of odor pickup and flavor loss that can ruin the quality of the packaged food.

Fat Preservative Ruling

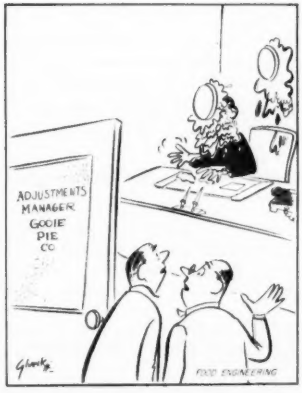
Addition of the preservative, monoisopropyl citrate, to animal fats and shortenings containing animal fats has now been authorized by the Meat Inspection Div., Bureau of Animal Industry.

Amounts added must not exceed 1/100 percent. When used, the statement "with not more than 1/100 of one percent monoisopropyl citrate added as a preservative" must appear on the label in direct connection with the name of the product.

Monoisopropyl citrate, when employed with other approved fat preservatives, must not exceed 5/1,000 percent. And in this case, the statement "and not more than 5/1,000 of one percent of monoisopropyl citrate" is to be included in the label declaration of the other added preservative.

Seals-In Onion Flavors

Trouble with slicing or chopping onions, according to Gentry, California dehydrators, is the loss of flavor from fractured cells. The flavor-containing liquid flows from the torn cells. However, at the firm's Gilroy plant this flavor loss is reported to be kept low by employment of a specially designed cutter with razor-sharp knives that make a minimum number of cuts. Onion sections are then immediately dehydrated in drying tunnels to seal-in the flavor.



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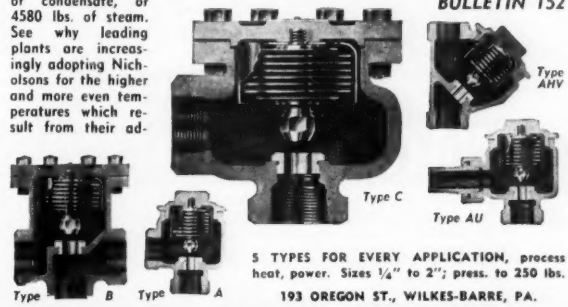

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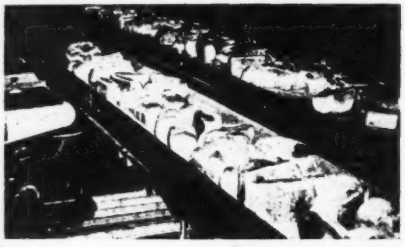

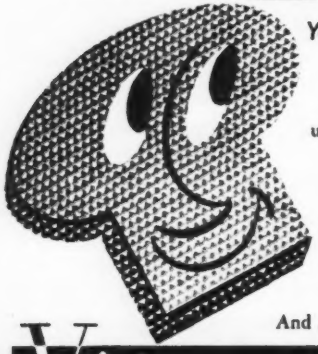

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Victor 475 is built right to stand up under the heaviest demands of the food processing industry. Composed of solid woven cotton belting thoroughly impregnated with Neoprene, it can withstand the action of vegetable, mineral, and fruit acids and oils. It's odorless . . . tasteless . . . can't pick up small particles. And . . . it's economical. You'll want to look into the advantages of Victor 475. It's fast relief for operation and production headaches. Send for Bulletin #18.

Victor Balata & Textile Belting Co.
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6641

New Food Committee To Advise Washington

To effect closer cooperation between Federal government agencies and food processing industry in the field of food sanitation, a Food Industry Liaison Group has been established. It consists of 60 representatives of important branches of the food industry and related industries. Affiliation is on a voluntary basis.

The group has set up an Executive Advisory Committee of ten members, one from each of nine major branches of the industry and a tenth selected by the Committee as chairman for one year. Herman Fakler, vice-president of Millers National Federation, is the first chairman.

Federal officials see considerable advantage in being able to confer with a single committee which speaks for the entire food industry.

Coffee Processed Faster

Development of a new continuous method for treating coffee "cherries" that effects a drastic reduction in processing time reportedly has resulted from research at the National Agronomical Center of El Salvador.

Caustic soda is the key product used in the process. A dilute solution is used to remove the mucilage from the coffee beans. Thus the 20-30 hr. previously required to do this by fermentation has been cut to about 1-hr. This is stated to permit shipment within 48 hr.

Oil and F&V Research

Oilseed Division and Fruit & Vegetable Division are the names of two new sections in the Southern Regional Research Laboratory of the U. S. Department of Agriculture.

These "will permit more effective prosecution of research in southern-grown oilseeds, fruits, and vegetables." They are headed, respectively, by Dr. A. M. Altschul and Dr. V. H. McFarlane.

Proposed Candy Research

Prevention of sugar blooming of refrigerated candies was the theme of a conference held last month at National Confectioners Assn. headquarters in the course of planning a third research project under the tri-sponsorship of the Refrigerated Research Foundation, Georgia Experiment Station, and NCA.

Objective of this work (to start this Fall) will be determination of the effect of such packaging materials as

Another STURTEVANT DEVELOPMENT!

IMPROVED INDUSTRIAL HEATER

for heating large plant areas

Two *new* Industrial Heaters with wide applications:

GENERAL PURPOSE HEATER

for manufacturing areas, warehouses, garages, commercial buildings — with standard heating coils.

HEAVY DUTY HEATER

for continuous-duty high-pressure systems, or industrial process work — with wrought iron heating coils.

EXCLUSIVE STURTEVANT FEATURES

HEAVY DUTY HEATERS—For rugged service, wrought iron 1" pipe is used instead of copper tubing. Tapered steel fins are metallically bonded to the pipe. Solder bath provides permanent bonding and corrosion-resisting external coating. Internal steam distributing pipes are also wrought iron, protect against freezing. *The entire coil assembly is as rugged as the connecting steam lines.*

SMOOTH EXTERIORS—Die-formed casings with rounded corners eliminate accident-causing sharp edges and dirt-catching pockets. Removable panels aid inspection.

ONE WARRANTY—Only Westinghouse makes all principal components—fans, heating coils and motors. You get unit engineering and single equipment responsibility.

Other features are:

WIDE RANGE OF SIZES—Heat output up to 2,500,000 btu/hr; air volumes up to 25,000 cfm; steam pressures up to 200 psig. ACCESSORIES—Filter boxes optional for mechanical air cleaning. Mixing boxes optional for proportioning outside and re-circulated air.

For more information, contact your nearest Westinghouse Sturtevant office. Or write for Catalog 1510, soon off the press. Address Westinghouse Electric Corp., Sturtevant Division, Hyde Park, Boston 36, Mass.

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100% AUTOMATIC FROM SLURRY SUPPLY TO PRESSED CAKE

J-C's own development . . . the Floating Cone* . . . holds a constant, automatically controlled pressure against the pressed pulp as it is discharged.

Provides for single or multistage continuous countercurrent extraction for processing industries, including the following:

PAPER PULP: ultra high density bleaching—de-inking—concentrated black liquor recovery

CANNERIES: Juice extractions from pulp—dewatering for by-product recovery

VISCOSE: optimum press ratios in continuously pressing alkali from cellulose

CORN STARCH PLANTS: dewatering germ and fiber

FISH REDUCTION PLANTS: presses cooked whole or waste fish products—maximum water removal and oil recovery

RECLAIMED RUBBER: drier product (15 to 18% moisture), higher quality rubber obtained

GLUE PLANTS: maximum grease recovery and drier final product

For application to individual problems, please write Dept. FE

* Patent applied for

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"Work well done since '81"

SAYS **STOP** TO SOLIDS

Yarway Fine Screen Strainers prevent rust, scale and dirt from clogging mechanical equipment. Screens of woven Monel wire, bodies and screen caps cadmium plated. Made in 10 sizes—¼ to 3". Sold by over 200 industrial distributors. Bulletin S-203.

YARWAY STRAINERS

YARNALL-WARING CO., 127 Mermaid Ave., Philadelphia 18, Pa.

cellophane, glassine, waxed paper, and aluminum foil on chocolate-coated vanilla creams, marshmallows, cherries, caramels, nougets, and assorted candies under varying storage conditions.

Confections will be stored at −5, 32, and 60 deg. F. While the relative humidity of the packaging and conditioning rooms will be predetermined, it is expected that samples will be packaged and conditioned in rooms with 40-45 percent relative humidity. A desiccant may be included in a few of the packages.

Extent of sugar blooming will be observed, examined with the microscope, measured with an electric photometer, and then photographed.

Curbing Off-Color Sausage

Studies carried out on sausage by the American Meat Institute Foundation indicate that contaminating bacteria are responsible for surface discolorations, green cores, and green rings. Such discoloration, the Institute reports, can be controlled by employing adequate heat processing and refrigeration and by manufacturing under sanitary conditions.

Hors d'Oeuvres

▶ **Democrats would support prices of meats, fruits, vegetables, and dairy products. Yet the Administration gets into a tizzy over price rises. Somebody has political sense where their brains out to be.**

▶ Says Representative Tolefson: You pay a nickel in taxes on a loaf of bread, 9 cents on a quart of milk, and 32 cents on a pound of beef. It's the high cost of feeding the politicians that makes eating expensive.

▶ **Imports of garlic will not be restricted. We have to help Italy. Besides, garlic is an "incidental" fill-in crop. So claims the President. To all this, California garlic farmers simply say: "It stinks."**

▶ With the aid of an antibiotic feed supplement, low-producing hens can be brought back to near-record egg production, Lederle Labs reports. Getting so a farmer has to be a pharmacist.

▶ **Australian scientists have discovered that bananas grow bigger under plastic film bunch covers, but they don't know why. Haven't bananas always filled their skins?**

▶ A GE engineer has designed a perpetual calendar. It tells you the day for any date from 1753 to 2059. So our birthday falls on Tuesday in 2059!

▶ **Sex hormones make virgin heifers give milk without calving. Might say they take the labor out of dairy farming.**

F&DA Food Standards

Ice cream standard inched forward during latter July with another eight days of testimony on surface-active agents. The hearing recessed on July 24, and was scheduled to resume Sept. 3 for extensive cross examination on these ingredients.

Bread standard final order, issued in May, became effective Aug. 13, except in respect to the emulsifiers. Court review of that part of the standard is scheduled for early October in the Third Circuit U. S. Court of Appeals, Philadelphia, where Glyco Products Co. has added its petition to that of Atlas Powder Co. The cases will probably be consolidated.

Final orders on *frozen fruits* and on *canned mushrooms* appeared to be nearing completion in early August. Tentative order on *residue tolerances* was also said to be nearing completion. *Canned pineapple* and *canned pineapple juice* hearing was not reopened; Sept. 15 was set as the date by which briefs should be filed; tentative order in this docket will obviously not be issued for some time.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Canned plums, revised, page 6615, July 19 *Federal Register*; effective Aug. 18.

Florida oranges, new, proposed, page 6713, July 22 *Federal Register*; written comments received until Aug. 21.

Dairy products, application and contract of agreement forms revised, page 6757, July 24 *Federal Register*; effective Aug. 1.

Frozen lima beans, fourth revision, page 6931, July 30 *Federal Register*; effective July 30.

Canned cream-style corn, third revision, page 6933, July 30 *Federal Register*; effective July 30.

Canned whole kernel (or whole grain) corn, third revision, page 6935, July 30 *Federal Register*; effective July 30.

Egg and egg products, grading applications regulations amended, proposed, page 6963, July 30 *Federal Register*; written comments received until Aug. 9.

Poultry and edible poultry products, grading applications regulations amended, proposed, page 6964, July 30 *Federal Register*; written comments received until Aug. 9.

Florida tangerines, new, proposed, page 7017, July 31 *Federal Register*;

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LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

LaPorte's Open Mesh Construction Feature enables you to keep your conveyor system hygienically clean at all times. Easily sterilized with steam or scalding water *without* removing belt from friction drum . . . free drainage prevents accumulation of waste . . . facilitates necessary circulation of heat, cold, moisture or air around products in process.

And whatever your process, you'll profit from extra years of dependable service with rugged LaPorte Belting. Built to last . . . to withstand extreme loading impacts. *Flexibility* assures tighter grip of belt on friction drum—can't creep, weave, or jump. Carries your product safely, quickly and economically through every operation . . . from bin to shipper!

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This Brewery in Los Angeles County, California, one of the finest in the country and one of three Lucky Lager Breweries on the Pacific Coast, uses four large Frick ammonia compressors with unusual reliability and economy in producing 700,000 barrels of beer annually. Installation by Eckert Engineering Co., Frick Distributors at San Francisco.

For the answer to your air conditioning, quick-freezing, ice-making or refrigeration problems, look to

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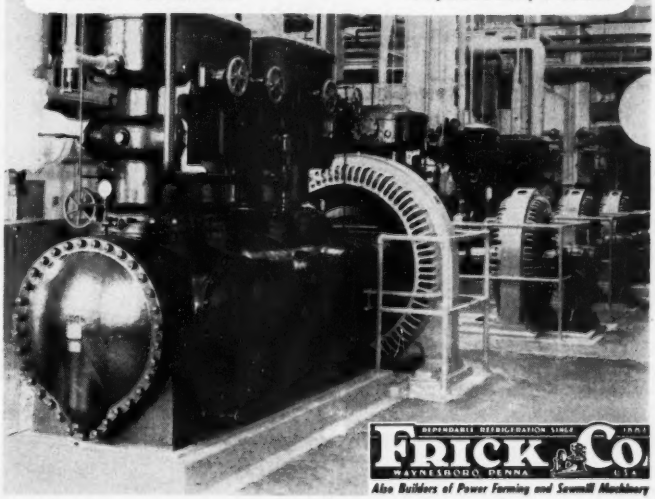

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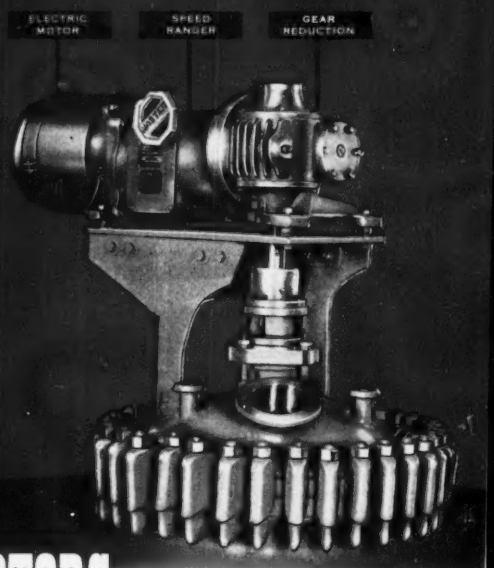

MASTER
ELECTRIC MOTORS

Schedule of Events

September

8–12—National Instrument Conference & Exhibit; Cleveland.
9–10—American Soybean Assn., 32nd annual convention; Purdue U., Lafayette, Ind.
9–13—National Chemical Exposition, 6th annual; Coliseum, Chicago.
14–19—American Chemical Society; Atlantic City, N. J.
18–19—International Assn. of Milk & Food Sanitarians, annual convention; Minneapolis, Minn.
21—First National Dairy Manufacturers' Conference; Drake Hotel, Chicago.
21–24—International Assn. of Ice Cream Manufacturers, annual convention; Conrad Hilton Hotel, Chicago.
22–23—American Butter Institute, annual meeting, Drake Hotel, Chicago.
22–27—Dairy Industries Exposition; Navy Pier, Chicago.
24—Evaporated Milk Assn., meeting; Blackstone Hotel, Chicago.
24—National Ice Cream Mix Assn., meeting; LaSalle Hotel, Chicago.
24–26—Milk Industry Foundation, annual convention; Sherman Hotel, Chicago.

October

3–7—American Meat Institute, annual convention; Palmer House, Chicago.
10–11—American Assn. of Cereal Chemists, annual Tri-Section meeting; Kansas State College, Manhattan, Kan.
14–16—Society of Industrial Packaging & Materials Handling Engineers, annual exposition; Coliseum, Chicago.
16–17—National Pickle Packers Assn., annual meeting; Blackstone Hotel, Chicago.
20–22—American Oil Chemists' Society, fall meeting; Netherlands-Plaza Hotel, Cincinnati, Ohio.
20–22—Packaging Institute, annual forum; Hotel Commodore, New York City.
20–24—National Safety Congress & Exposition, Conrad Hilton, Congress, Morrison, Sheraton, and LaSalle Hotels, Chicago.
22–25—National Bakery Suppliers Assn., annual convention; Drake Hotel, Chicago.
26–28—National Pretzel Bakers Institute, annual convention; Netherland-Plaza Hotel, Cincinnati, Ohio.

November

10–12—Grocery Manufacturers of America; New York City.
16–21—Master Brewers Assn. of America; annual convention; Jung Hotel, New Orleans, La.
17–20—American Bottlers of Carbonated Beverages, annual meeting, and International Beverage Exposition; Auditorium, Atlantic City, N. J.
19–21—Dairy Manufacturers' Short Course; Texas Technological College, Lubbock, Tex.

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written comment received Aug. 30.

Persian (Tahiti) limes, revised, page 7035, Aug. 1 *Federal Register*; effective Aug. 31.

Frozen whole kernel corn, third revision, page 7038, Aug. 1 *Federal Register*; effective Aug. 1.

Edible sugarcane molasses, correction, page 7135, Aug. 6 *Federal Register*; correcting a table which appeared on page 6183, July 10 *Federal Register*.

VIKING TRUCK PUMP UNLOADS 30,000 POUNDS OF 140° SYRUP IN 20 MINUTES

With Viking-equipped trailer tank trucks, Quality Milk Service, Inc., Burlington, Wisconsin unloads liquid cargoes in 20 to 60 minutes, depending upon viscosity and unloading conditions. These include such liquids as milk, milk products, corn syrup, liquid sugar, fruit juices, corn oil, salad oil, edible fats, molasses, spring water, etc. Temperatures are often as high as 180°F. Even with this severe service, no pump maintenance work has been required since installing VIKINGS three years ago.

Vikings are ideally adapted to most pumping problems. For additional information, write for bulletin series 525E today!

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

THE ORIGINAL "*GEAR-WITHIN-A-GEAR*" ROTARY PUMP

Need better cleaning to meet sanitary regulations?... Put Metso to work for these results:

1. Fast removal of oil, fat, protein, albumen and solid dirt.

2. Complete rinsing.

3. Non-corrosive—prevents corrosion by other alkalies.

Use safely for manual and machine cleaning. Request *free* folder, "Cleaning in the Food Industries."

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tests for the Best

in **PROTECTIVE PACKAGING** include Salt Spray and Immersion, Air, Light and Moisture. They must stay out — Goodness must stay in!

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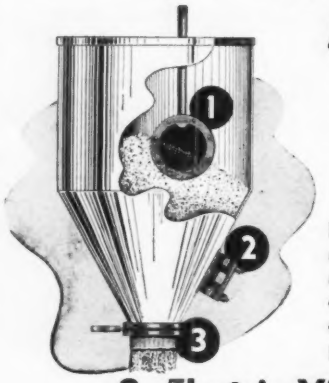
for Complete Hopper Efficiency—

SYNTRON



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Eliminate spillage and shortage of materials. Automatically maintain desired levels of materials—from fine to coarse—in bins and hoppers. Control feeding.

2. Electric Vibrators

Assure free-flowing bins, hoppers and chutes. Eliminate arching and plugging of materials without hammering and rodding that damages equipment and wastes manpower.

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Control flow of bulk materials from bins, hoppers and chutes. Rotating control lever increases or decreases opening of flexible iris type diaphragm and flow of material without jamming or clogging.

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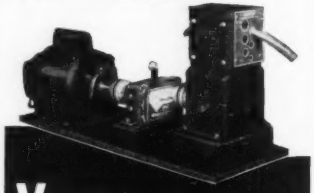

VARIABLE From ZERO to MAXIMUM

No Corrosion
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For inexpensive laboratory pumping of any liquids, gases, or solids in solution, the SIGMAMOTOR — used with the Zero-Max Torque Converter — is receiving wide acceptance. Automatic "fingers" provide pressure on flexible tubing for moving the fluid. The Zero-Max provides full torque conversion from zero to maximum speed ranges. Speed settings are accurately repeated every time.

SIGMAMOTORS can be used for small flows or proportional flows of two or more liquids. Flow rates range from 0 to 30 gallons per hour. Quickly adaptable to different solutions.

WRITE today for details on how SIGMAMOTOR and Zero-Max can render economies in your pumping jobs.

SIGMAMOTOR Inc.
22 NORTH MAIN ST. MIDDLEPORT, N. Y.

Shelled pecans, revised, proposed, page 7150, Aug. 6 *Federal Register*; written comments received until Sept. 5.

Cottonseed, revised, page 7177, Aug. 7 *Federal Register*; effective Aug. 1.

—*End*—

Cleaned-in-Place Pipelines

—*Continued from page 82*

the line. There is enough scrubbing action in the turbulent flow of cleaning solution.

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8. W. H. Haskell, "Cleaning and Sanitizing Permanent Pipeline Installations," *The Milk Dealer*, Dec. 1951.

End (*Resume reading on page 83*)

Plant Floors Can "Take It"

—*Continued from page 74*

floor construction. In one successful method, the tile was embedded in furane cement spread on an impervious membrane of plasticized asphalt. This is an apparently sound method, but the techniques are somewhat foreign to those customarily employed by tilesetters.

New Method Developed

Many tile men have suggested that the impervious membrane should be a part of the floor slab construction, and that a fast-setting resinous bed cement having excellent adhesion to the floor slab should be used.

Such a construction is now available experimentally and promises to eliminate many of the previous difficulties—and give even greater longevity.

This type of construction may be used with either bricklayer or tilesetter techniques.

In the former case, a fast-setting resin cement, which adheres tenaciously to Portland cement, is spread on the floor slab to a thickness of about ⅛ in. Then while this is still soft, tile buttered with furane on two vertical edges is set in place.

The excess resin is struck from the surface with a wet trowel, and the floor is allowed to remain undisturbed until the joints harden. This method gives a technically sound floor, although it is not considered satisfactory when straight joints in two directions are required.

With the tilesetters' method, either 6x6x¾-in. quarry, or 8¼x4x1⅜-in. tile may be used. It is preferable to coat the top surface with molten paraffin, being careful to keep it off the vertical surfaces. This step helps to cure flush joints and eliminates problems associated with cleaning the tile.

The floor slab is finished to grade, allowing ⅝ in. for quarry and 1½ in. for 1¾-in. tile. Slump should be maintained at approximately ¼ in. per foot, and the slab should be given a wood float finish. The waterproof membrane in the floor slab must be extended up the vertical walls to a height above the final finished floor level.

Next, a fast-setting resin cement—which adheres tenaciously to the Portland cement—is troweled to approximately ⅛ in. on the smooth, clean floor slab. Tiles are then embedded in the resin while it is still in workable state.

They may be pressed or beaten down to secure a satisfactory level surface. Any resin exuding in the vertical joints will not interfere with the set of the furane.

After the tiles are set rigidly, a thin furane mortar is prepared, using a ratio of approximately 3 parts powder to 2 parts liquid by weight. This will fill the joints, and provided air is not present in the mortar, essentially flush joints will then be secured when it hardens. It is preferable to strike the joints with a wet trowel and to point up any that have settled due to escape of entrapped air.

Approximately 24 hr. after the joints have become thoroughly hard, the floor is steamed to remove paraffin from the tile. This is usually about 48 hr. after the installation at 60-85 deg. F.

This floor construction encompasses all the characteristics of an ideal food-plant floor. And with proper installation, the surface should give service similar to that obtained from furane grouted tile floors installed by bricklayer methods.

End (Resume reading on page 75)

Milk Tank Trucks

—Continued from page 145

washers. It has greatly reduced labor requirements in the receiving room, since there are no cans to be dumped, and has released the space formerly needed for can washers and can-handling. This space can now be more economically used in processing.

Since the milk now arrives at a temperature of 39-40 deg. F. (as against 50-60 deg. when cans were used) cooling prior to storage or in the storage tanks is eliminated. This represents a definite saving in refrigeration.

Bacteria counts (on both raw and pasteurized milk) have been reduced considerably where the bulk system has been installed.

System Expanding Rapidly

Among the milk companies now operating tank-truck pickup routes are: Bryant & Chapman-R. G. Miller & Sons, Hartford, Conn., who pioneered the system; Edisto Farms Dairy, Columbia, S. C.; Green Valley Farms, Haddonfield, N. J.; Swaner Farms Dairy, Iowa City, Iowa; and Maryland & Virginia Milk Producers Assn., Washington, D. C.

Also, River Falls Cooperative Creamery, River Falls, Wis. is operating a 30-farmer route; Lynden Dairy Products Co., Lynden, Wash. has several; and Connecticut Milk Products Assn. has two routes.

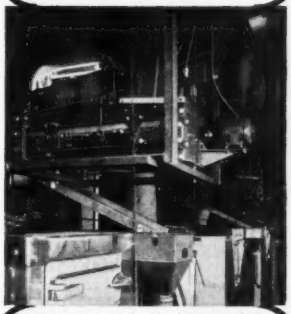
Operations Pinpointed

In operation of the bulk handling system, milk is picked up daily by a tanker and delivered to the processing plant. However, some companies are now on an every-other-day pickup, and others have received health department approval for use of this method.

When the truck driver arrives at a farm, he backs his tanker into position as near to the milk house door as possible to permit easy transfer of the milk. He then enters the milk house, checks the milk's odor and temperature, ascertains its weight (by means of a measuring rod that has been carefully calibrated for this particular tank, and with reference to the calibration chart on the milk-house wall), then starts the agitator.

While the milk is mixing, the driver returns to the truck, opens the door to the rear compartment, removes the hose, sanitizes it with a chlorine solution and connects it to the pump and farm tank. Then he

HERSHEY CHOCOLATE SOLVES A FEEDING PROBLEM with W&T MERCHEN FEEDERS



W&T Merchen Feeders feeding cocoa beans to roasters at Hershey Chocolate Corporation, Hershey, Pa.

The volumetric feeders supplying the Roasting & Separation Systems at Hershey Chocolate Corporation were not compensating for density changes in the beans.

A Merchen Scale Feeder was installed in each system giving precision feeding — by weight. The precision feed made separation more efficient, and production was increased by over 10%. Hershey had planned to add additional roasting and separation facilities but the Merchen Feeders increased the efficiency of the existing systems enough to easily carry the load.

Pleased with this performance of Merchen Scale Feeders, Hershey later installed eight more feeders on their main cocoa bean blending line.

Hundreds of food and industrial plants are enjoying similar benefits from W&T Merchen Scale Feeders. Write today for information on Merchen Feeders — and how they can benefit your plant. M-20

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INDUSTRIAL WASTE TREATMENT

Just Out!

A practical guide to the problem of dealing with industrial wastes. Covers the important legal aspects of stream pollution, tells how to secure samples and data, and how to develop and test a method of treatment. Discusses factors of plant design and construction to minimize pollution, and the techniques of reclaiming byproducts from industrial wastes. **By E. B. Besselievre, Chief Sanitary Eng., Foreign Div., The Dorr Co. 365 pp., 100 illus., $7.00**

SANITATION for the FOOD PRESERVATION INDUSTRIES

Presents workable principles and methods of good plant sanitation. Gives "how-to-do-it" material of value to all food processors, and particularly useful to the canning, freezing and dehydration industries. There is also much to help those concerned with sanitary transportation, storage and distribution of both fresh and processed foods. Here are helpful illustrations, all the essential steps, equipment, applications, etc. **Prepared by The Association of Food Industry Sanitarians, Incorporated, in cooperation with The National Canners Assoc. 284 pages, 118 illustrations, $5.00**

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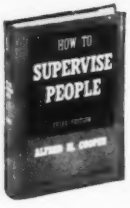
Third Edition



On-the-job facts for supervisors—in shop, field, or office. Solves problems in hiring, discipline, preventing accidents, promoting teamwork, training workers, delegating authority, labor relations, etc. Presents examples of typical problems and specific solutions now in use. Third edition includes discussion of the Taft-Hartley law as it affects the supervisor, outlines a program for employee participation in management, and provides other new material. **By Alfred M. Cooper. Third Edition, 254 pages, $3.75**

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plugs in the pump motor to the farm electric outlet.

By this time the milk has been thoroughly mixed, so he takes a sample for butterfat. This is poured in the bottle on the truck. Then he stops the agitator, opens the tank's valve, starts the pump, and transfers the milk to his tanker. This completed, he unfastens the hose at the tank, closes the end with a special stainless steel plug, coils the hose in the compartment, and closes the doors.

In most cases the driver thoroughly rinses the farm tank before he drives away to the next farm. The farmer later washes and sterilizes it according to instructions given by the dairy's field man.

End *(Resume reading on page 147)*

Nickel and High-Nickel Alloys

—Continued from page 97

typical of the pea canning industry, at least from the standpoint of corrosion conditions.

Results of the several tests are shown in the graphs at the beginning of this article. Here are plotted the maximum rates of corrosion as indicated by the upper edges of the shaded blocks, the minimum rates as indicated by the lower edges, and the average rates as shown by the circles within the blocks. The number of tests is indicated by the figures above the shaded blocks.

The corrosion tests in the corn canning equipment were made in the plant in which the pea canning tests were made.

Results of these tests are shown in graphs (below) prepared in the same manner as the graphs covering the pea canning equipment.

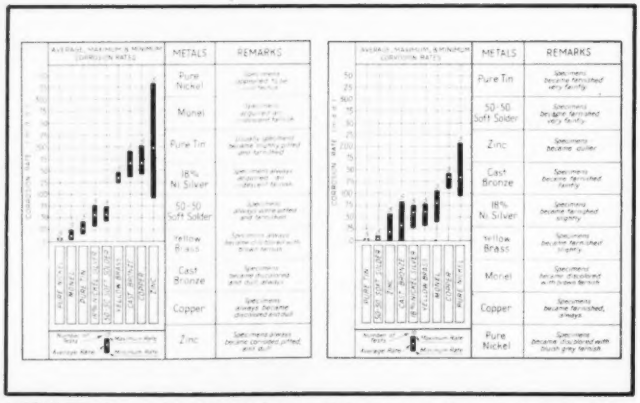
In the case of the corn mixer, as will be noted from the last graph, tin, solder, and zinc were most resistant to corrosion. The relatively greater degree of corrosion of nickel and Monel in the mixer as compared with their high resistance to attack by both cold corn and hot brine separately, provides an interesting example of the effects of combined corrosive agencies in intensifying each other.

From these data, it would appear to be wise to tin all surfaces coming into contact with hot mixtures of brine and corn. Since these tests were made, there has been some evidence that the high nickel-chromium alloy, Inconel, will prove a solution to the corrosion problem of hot brine and corn mixtures and thus may provide a useful alternative to tinned coatings.

The International Nickel Co. gratefully acknowledges the helpful cooperation of R. S. Thorne of the Geneva Preserving Co., Geneva, N. Y., in connection with the corrosion tests in pea and corn canning equipment, and A. D. Kennedy and B. W. Clarke of the Crosse & Blackwell Co., Baltimore, Md., in connection with the corrosion tests in tomato processing equipment (Part I, FE Aug.).

The kindness of the research staffs of the National Canners Assn. and the Continental Can Co. in examining the inoculated samples of peas and corn was also of very great help.

Corn



RESULTS of corrosion tests made on metals at two stations—brine tank (left), mixer (right)—are shown by these graphs.

Meter Takes Mixers' Pulse

—Continued from page 89

important information regarding the mixing process. Failure to add salt will show up through the resultant effect on the shape of the viscosity curve. Use of too much or too little water will also thus be indicated. When salt is added during mixing, there is a characteristic "droop" in the viscosity curve.

In addition, the curve serves as a daily log of mixer operations. The chart record shows the number of mixes during a shift, also the time of loading, mixing, emptying, and reloading, and the amount of time between mixes.

Regaining "Product Contact"

Modern dough mixers do an excellent job of blending ingredients, making possible a day-to-day uniformity unattainable by the old hand-kneading methods.

However, machine operations have tended to take the baker out of contact with his product during the critical mixing process.

Many efforts have been made to compensate for this loss of personal contact—for example, the use of automatic scales and water meters, and careful weighing of all ingredients as standard practice. Experience has shown that these modern methods make it possible for the baker to turn out identical batches of dough, time after time, without difficulty — provided there is no change in any of the ingredients used.

But it must be remembered that the average bakery consumes flour at a tremendous rate, and formula changes must be made for every new lot of flour.

Flour composition differs with the type of wheat used, the geographical location of the supply, and even the weather conditions which prevailed while the grain was being grown. All these variations are important because they affect (1) the ability of flour to absorb water and, therefore, (2) the elasticity which will be developed in the dough when mixed.

Changing from one lot of flour to another without making formula corrections may result in a dough that bakes into a flat, heavy loaf. Or it may give an undesirably light dough that tends to spill over during proofing or baking and give a coarse loaf.

The conventional method of compensating is to have each new batch of flour laboratory tested and to obtain flour consistency graphs. The graphs give some indication of how the flour will behave in the dough mixer, showing how rapidly the gluten develops and how much mixing time is required to reach maximum viscosity.

While this information helps determine how the new flour will compare, further experimentation is needed. A common practice is for the baker to adjust his formula on the basis of the new information, and to run a series of test mixes to find what final adjustments must be made in mixing time and in mix composition.

Final results, after testing and experimentation, are usually good. In fact, some bakers obtain satisfactory results by simply experimenting with the new batches of flour as they come in, without going to the trouble of taking samples and shipping them off for lab testing.

However, the entire procedure is time-consuming, and the baker is not quite sure on the question of whether his bread might be still further improved by additional formula changes.

It is here that the new instrumentation is seen making a notable contribution.

End (Resume reading on page 90)

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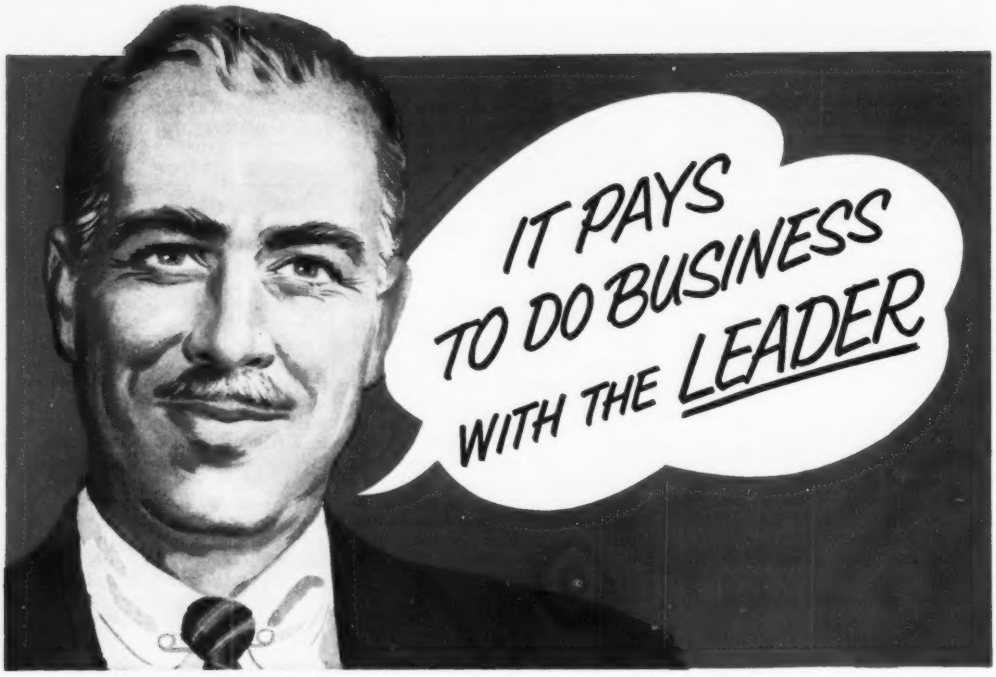

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PRODUCTS

Comminuted Meat Product Containing Pickle Relish Made by Removing Vinegar From Relish and Dehydrating Residue Prior to Mixing With Meat—*W. E. Hauch, Forest Park, Ill. to Swift & Co., Chicago. No. 2,600,765. June 17, 1952.*

Dry Milk Product With High Water Absorption Capacity Made by Coagulating Through Increasing Mineral Content and Heat Treatment, Settling, Decanting, Drying Coagulated Portion—*R. E. Meade, Appleton, Wis. to Western Condensing Co., San Francisco. No. 2,602,746. July 8, 1952.*

Dry Milk Product With High Water Absorption Capacity Prepared by Acidulating Raw Liquid Whey, Neutralizing, Heating, Adding Heated Skim Milk, Evaporating, Further Acidulating and Neutralizing, Drying—*R. E. Meade, Appleton, Wis. to Western Condensing Co., San Francisco. No. 2,602,747. July 8, 1952.*

Shortening Composition for Bread Mix Consisting of Reactant From Lactic Acid Neutralized With Calcium Compound—*F. F. Hansen, Pittsburgh. No. 2,602,748. July 8, 1952.*

Frozen Confection Mix Made With a Small Proportion of Organic Compound Containing Alkyl Radicals of Monobasic Straight Chain Acid—*K. R. Brown, West Chester, Pa. to Atlas Powder Co., Wilmington, Del. No. 2,602,749. July 8, 1952.*

PACKAGING

Method of Packing Fruit by Having Outer Display Layer in a Rigid, Removable Sheet Aluminum Tray—*C. F. Stuart, Warren, Ohio to Guy E. Lane, Youngstown, Ohio. No. 2,559,790. June 10, 1952.*

Package for Shipment and Storage of Food Comprising Plurality of Separate Rectangular Metallic Foil Covered Bodies Enclosed in 1-Piece Foil Wrapper—*W. L. Morrison, Lake Forest, Ill. No. 2,600,069. June 10, 1952.*

Bakery Package Employing Selective Light Shielding Means to Inhibit Deleterious Photochemical Action—*M. R. Coe, Washington, D. C. to Rile-Coe Filter Process, Inc., Pinehurst, N. C. No. 2,600,093. June 10, 1952.*

Carton Handling and Loading Apparatus Which Reorients Container From End-to-End to Side-by-Side Position—*R. J. Fahey, Evanston, and M. Burger, Morris, Ill. to Shellmar Products Corp., Chicago. No. 2,601,750. July 1, 1952.*

PROCESSES

Preserving Eggs by Subjecting to Vacuum While Submerged in Aqueous Caseinate Fluid, Then to Positive Pressure to Impregnate Shell and Coat Surface—*A. Napper, Woodlands, Southland, New Zealand. No. 2,595,808. May 6, 1952.*

Quick-Curing and Cooking Meats by Treating Fresh Products With Dialkali Phosphate and Raising pH to 6.8—*G. E. Brissey, to Swift & Co., Chicago. No. 2,596,067. May 6, 1952.*

Method and Apparatus for Curing Meat Products by Subjecting Hanging Goods to High Velocity Swirling Gaseous Heating Medium —*S. Doty, Floral Park, N. Y., to Woodside Smokehouse Co., Woodside, N. Y. No. 2,596,381. May 13, 1952.*

Sterilizing and Stabilizing Whole Sweet Milk by Blending With Edible Hydrogen Peroxide, Homogenizing, Stabilizing With Heat—*L. T. Winger, Trinidad, Colo. No. 2,596,753. May 13, 1952.*

Continuous Process for Preserving Potatoes by Steam Peeling, Ice Water Spraying During Rubbing, Cutting, Treating With Aqueous Solution of Sodium Bisulphite, Blanching With Live Steam, Forced Air Drying, Cooking, Quick-Freezing—*H. M. Chase, to A. M. Chase, Nampa, Idaho. No's. 2,597,065, 66, 67. May 20, 1952.*

Treating Wet-Rendered Tankage to Separate Solids, Grease, and Water-Containing Solubles by Emulsifying Water and Grease, Separating Solids, Then Separating Emulsion Into Grease and Water Constituents—*C. J. Davis, to Armour and Co., Chicago. No. 2,597,230. May 20, 1952.*

Process for Treating Whale Glue Water by Reducing pH to 4-5, at Temperature of 180-212 deg. F., Separating Undissolved Solids and Liberated Oil—*W. C. Davis, Tredyffrin, Township, Chester County, Pa., to The Sharples Corp., Philadelphia. No. 2,598,038. May 27, 1952.*

Treating Tomato Juice With Supersonic Waves to Break Cell

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Structure and Partially Gelatinize Juice—*R. A. Havens, B. E. Orr, P. R. Pitts, and R. W. Cunningham, to R. A. Havens, Indianapolis.* No. 2,598,374. May 27, 1952.

Inhibiting Harmful Photochemical Action in Dairy Products by Shielding to Admit Only Wave Lengths of Light in Certain Zones—*M. R. Coe, Washington, D. C., to Rile-Coe Filter Process Co., Pinehurst, N. C.* No. 2,598,506. May 27, 1952.

Preserving Shell Eggs by Coating With Relatively Non-Volatile Mineral Oil and Cyclized Rubber Resin—*L. D. Mink, to Swift & Co., Chicago.* No. 2,598,586. May 27, 1952.

EQUIPMENT

Dough Mixer With Refrigerant Conduit Piping in Jacket and Plurality of Short Ribs on Inner Face for Gripping Dough—*M. A. Stickelber, to Stickelber & Sons, Inc., Kansas City.* No. 2,593,705. April 22, 1952.

Centrifugal Cream Separator With Tubular Vertical Shaft Having Plurality of Upwardly Flaring Discharge Passages—*G. J. Strezynski, Poughkeepsie, N. Y., to The De Laval Separator Co., New York City.* No. 2,593, 934. April 22, 1952.

Smokeless Coffee Roasting Apparatus Consisting of Pressure-Tight Drum Connected to Vacuum System and Condensor With Means for Readmitting Condensate to Beans—*E. Chalupa, New York City.* No. 2,593,983. April 22, 1952.

Apparatus for Treating Liquid Dairy Products Including Rotatable Shaft Entering Vessel Through Pressure- and Vacuum-Tight Seal—*F. G. Cornell, Jr., Mountain Lakes, N. J., to Chester-Jensen Co., Chester, Pa.* No. 2,594,399. April 29, 1952.

Ice-Cream Manufacturing Apparatus Incorporates Liquid Refrigerant in Ice Cream Mix Under Pressure, With Solidification of Mixture Occurring at Atmospheric Pressure on Discharge—*E. M. Irwin, San Marino, to Basic Processes, Inc., Pasadena, Calif.* No. 2,594,442. April 29, 1952.

Machine for Removing Eggs From Shells Continuously Employing Piercing Pins Above and Below Egg and Air Stream That Forces Contents Through Lower, Larger Hole—*A. Bosch and G. J. Noltes, Amsterdam, Netherlands.* No. 2,594,619. April 29, 1952.

Poultry Scalding Apparatus Employing Track-Bourne Hanger for Oscillatingly Immersing Fowls in Tank of Hot Fluid—*F. C. Valenta, Burbank, Calif.* No. 2,594,829. April 29, 1952.

Potato Waxing Machine Employing Transverse Moving Spray Nozzle Over Longitudinally Moving Conveyor Belt and Rotating Cylindrical Brush—*T. J. Lockwood, Gering, Nebr.* No. 2,595,151. April 29, 1952.

Dough Mixer With Jacket for Holding Liquid Refrigerant Forming Part of Thermostatically Controlled Flooded Expansion System—*A. W. Ruff, to Read Standard Corp., York, Pa.* No. 2,595,298. May 6, 1952.

Device for Stabilizing and Homogenizing Liquid Mixtures Employing Centrifuge and Built-In Whirl Chamber to Subject Larger Particles to Liquid Friction—*S. H. B. Zachariassen, to Aktiebolaget Separator, Stockholm, Sweden.* No. 2,595,376. May 6, 1952.

Poultry Plucking Machine Employing Plurality of Oval-Shaped Flexible Fingers on Power Driven Rotor—*R. W. Wolfinger, Delaware, Ohio, to W. H. F. Schmieding, Columbus, Ohio.* No. 2,595,435. May 6, 1952.

Dough Forming Machine Comprising Pair of Spaced Parallel Downwardly Traveling Belts for Conveying Sheet Through Vertically Spaced Pairs of Horizontal Forming Rolls—*J. C. Lunsford, to H. C. Rhodes, Portland, Ore.* No. 2,595,865. May 6, 1952.

Continuous Doughnut Cooker Employing Tray-Bearing Chain Conveyor to Move Product Through Cooking Medium—*J. C. Lunsford, to H. C. Rhodes, Portland, Ore.* No. 2,595,866. May 6, 1952.

Apparatus for Continuously Mixing Grain and Gas in Accurate Proportions in Impact-Type Chamber With Gas Control Effected Through Measurement of Driving Motor Electrical Torque—*R. B. Dodds, Woodbridge, Conn., to The Safety Car Heating & Lighting Co., Inc., New Haven, Conn* No. 2,596,220. May 13, 1952.

Electrically Heated Wafer Oven Comprising Endless Track and Heating Plates Automatically Controlled at Fixed Temperature Differential—*J. F. Naylor and D. Greener, to T. and T. Vicars Ltd., Newton-le-Willows, England.* No. 2,596,278. May 13, 1952.

Machine for Picking Fowl Automatically by Upward Moving Picking Force While Fowl is Suspended Head Down From Conveyor—*A. W. Sharp, to Barker Poultry Equipment Co., Ottumwa, Ia.* No. 2,596,443. May 13, 1952.

Egg Washing Machine Comprising Pair of Parallel Spaced Rollers With Absorbing Pad Dipping Into Cleaning Fluid and Parallel Advancing Ridges—*R. A. Joseph, Peraluma, Calif.* No. 2,597,148. May 20, 1952.

Confectionery Depositing Machine Comprising Plurality of Piston-Equipped Cylinders and Movable Cut-off Plate—*G. S. Perkins, Kew Gardens, N. Y., to National Equipment Corp., N. Y.* No. 2,597,175. May 20, 1952.

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Cake Icings	Frozen Fruit Juices	Ripple Ice Cream Syrups
Canned Fruit	Fruit Fillings (Pie)	Sauces (Prepared)
Cheese Spreads	Fruit Juices	Sherbet Stabilizers
Chocolate Milk	Fruit Pie Fillings	Soups
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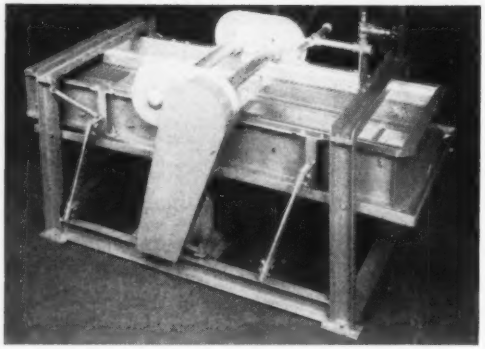

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Men & Companies

Clarke E. Davis has been named executive vice-president of the Virginia Dare Extract Co.

Industry

Berjans Farm Dairy is constructing an additional plant to be located at Overland, Mo. Cost: $75,000.

Brewing Corp. of America, Cleveland, announces plans for expanding its facilities. Cost: To $10 million.

John E. Cain Co. has placed its new potato chip plant at Medford, Mass., in operation. Cost: $100,000.

Carnation Co. announces it will erect a research center in Van Nuys, Calif. Cost: $500,000.

Cerveceria Andina of Bogota has invested in a new brewery, thus doubling capacity. Cost: $1,600,000.

Cold Springs Dairy Products, Buena Vista, Va., is now a possession of Clover Creamery Co., Inc.

Daveat Milk Processes Co., dairy products maker, has filed a charter of incorporation in Del. Capital listed: $3,000,000.

John H. Dulany & Son, Inc., Fruitland, Md., recently promoted Woodrow W. Lang to sales manager of the canned food division and David L Dulany to assistant.

Dungeness Crab Co., Inc., Westport, Wash. cannery, has been destroyed by fire. Loss: $150,000.

Eckert Packing Co., Defiance, Ohio, announces plans for expansion. Cost: $140,000.

Folger Coffee Co. intends leasing a coffee processing plant to be built in Portland, Ore. Construction cost: $1,500,000.

Franken Sugar Factory, Ochsenfurt on the Main, Germany, will be in operation shortly. Capacity: 2,400 tons of beets per day.

General Foods has elected three new vice-presidents: G. O. Bailey, R. M. Schmitz, and Wayne Marks.

H. J. Heinz Co., Tracy, Calif., has received the first Safety Council award to a West Coast food processing plant—for a no-accident record in 1951.

Hi-Land Dairy, Salt Lake City, is setting a new plant in operation. Cost: $1,000,000.

Leslie Salt Co. has purchased properties in Napa and Solano counties, Calif., for a 1958-scheduled output of salt. Cost: $1,250,000.

Louisburg Fisheries Ltd. recently began operations in its Nova Scotia fish-freezing plant. Capacity: 30–40,000,000 lb. annually.

Mawhinney Ice Cream Co., Benton Harbor, Mich., has been incorporated to make ice cream, ices and sherbets. Capitalization: $100,000.

Royal Family Bottling Co. of Texas recently put a Dallas plant into operation. Cost: $150,000.

Rubsam & Horrmann Brewing Co. elected the following officers lately: A. Horrmann, board chairman; W. Lucaa, president; and C. Richter, vice-president and treasurer.

Saxton Bottling Co., Saxton,

C. I. Chase, of Paulus Bros. Packing Co., Salem, Ore., is newly elected president of the Associated Blue Lake Green Bean Canners, Inc.

Specialists in stainless tubing and pipe...

SIZES 3/8" TO 3"

PROMPT RESPONSE TO YOUR INQUIRY

DAMASCUS TUBE COMPANY

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA

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with new vacuum pick-up

Simplifies Bag Sealing and Labeling!

SEALS AND LABELS IN ONE EASY OPERATION!

No staples—no pins—no handwork!

Simultaneously attaches labels and heat seals all bag materials up to 6" wide or seals, only, to 10" wide! Finger-tip control with automatic Phantom Feed. Quickly pays for itself 2 ways: Lowers labor cost; requires no expensive thermo-plastic coated papers.

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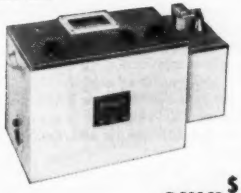
IF YOU PACK CORN USE THE STEINLITE 300 maturity tester

The fastest, surest, lowest cost way to improve uniformity and quality of pack. Increase your profits this year with more EXTRA FANCY corn selected by testing moisture with a Steinlite 300 LSC.



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IF YOU CAN OR FREEZE OTHER VEGETABLE AND MEAT PRODUCTS WRITE FOR INFORMATION. Learn how the Steinlite 300 LSC can help you control uniformity, increase quality and yield of your pack. **Write today for complete facts. No obligation, of course.**

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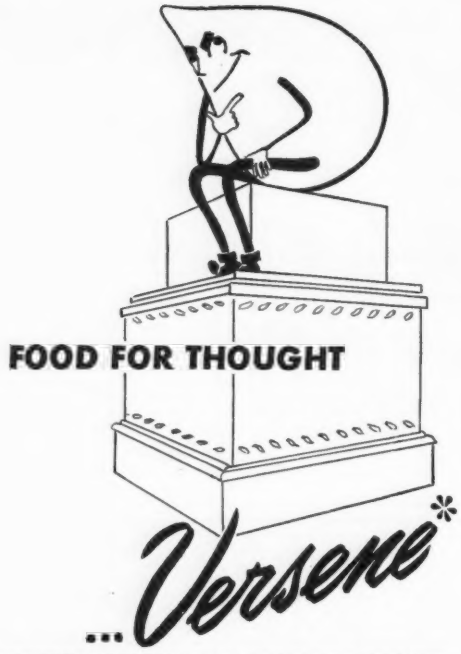

VERSENE* PROTECTS BOTH PRODUCT & PROCESS

Every day more and more spoilage of processed food is being traced to metallic ion contamination. Food chemists know that the best way to prevent it is through the use of Versene. This powerful Chelating Agent controls troublesome Cations by keeping them in soluble complex form. Thus does it prevent "tinny" taste, discoloration, rancidity, loss of shelf-life, fragrance and flavor.

VERSENE*-TOXICITY TESTED

Years of toxicological research, in accordance with suggested procedures of the FDA, prove the safety of Versene when used to prevent metallic ion contamination. When added in the small quantities needed Versene is colorless, odorless and tasteless. Versene is made only by the Bersworth Chemical Company under processes originated, developed and patented by F. C. Bersworth.

VERSENE*-SAFEGUARDS SATISFACTION

Brand satisfaction depends on consistent quality. Versene controls the metallic contaminants that cause spoilage in either process or package. Because it can insure goodness it is worth investigation. Versene has exceptional stability at all temperatures and pH's. Uniformity of complexing power and quality of manufacture are guaranteed. Because of its remarkable synergistic action with quarternaries Versene is ideal for cleaning food processing equipment. Ask for sample and Technical Bulletin No. 2. Write Dept. T.

VERSENE* WATER TEST KIT. Tells Total Hardness in 2 minutes. Accurate to 1 grain per gal. Versenate Method. Complete with instructions $5.00 Postpaid.
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FRAMINGHAM, MASSACHUSETTS

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Barada & Page, Inc.
Dallas – Houston – New Orleans – Oklahoma City – St. Louis – Tulsa • Wichita
Copyright 1952, Bersworth Chemical Co.

Earl L. Prais is newly appointed quality control manager for the Liquid Carbonic Corp., Chicago.

Pa., will shortly have doubled its capacity through an expansion program. Cost: $100,000.

C. A. Swanson & Sons, Omaha, offers a scholarship to be available each year for 5 yr. to the American Institute School of Baking. Amount: $750 annually.

Personnel

William A. Bittel, Jr., is now vice-president and general sales manager for the Charles B. Knox Gelatine Co.

A. H. Blount has been named general manager of Tea Garden Products Co., San Francisco.

Reed A. Blackwell was recently made executive vice-president, Gordon Foods Inc.

Dr. M. R. Clarkson has been appointed deputy administrator of the Agricultural Research Admin.

Carlton Crawford, president of Texas Shrimp Assn., is now also president of the Shrimp Assn. of the Americas.

Carl H. Cummings is new general manager of Haydon Mfg. Co., Torrington, Conn., maker of synchronous motors and timing devices.

Vincent DeDomenico, of Golden Grain Macaroni Co., San Leandro, Calif., has been elected a director of the National Macaroni Manufacturers Assn.

Herbert S. Epstein, advertising manager of Pfeiffer Brewing Co., is now also a vice-president. He is 26.

Edward H. Green has been elected a director of Campbell Soup Co.

A. F. Guckenberger becomes advertising manager of the Ward Baking Co., effective Sept. 26.

Richard Y. Kyde was recently made canned meat sales manager of Stahl-Meyer, Inc.

W. D. McAfee is new general sales manager of Burgermeister Brewery, San Francisco.

S. Lee Miller, Jr., has been named head of the export and government sales division for Hunt Foods, Inc.

William H. Mooney, Cincinnati, is now president of Kingan & Co., Indianapolis meat packer.

Carl W. Ruby has been elected a director and vice-president of the Beech-Nut Packing Co.

Shirley R. Smith is newly appointed general manager of Petri Distributing Co., San Francisco.

W. J. Stebler was elected executive vice-president of the General American Transportation Corp., Chicago.

Henry G. Strong is currently chairman of the Refrigeration Industry Safety Advisory Committee. He succeeds L. W. Larsen.

Joan E. Thimm has been named head of the food chemistry research department of Buitoni Products Co., S. Hackensack, N. J.

B. L. Turner, vice-president of the Comstock Canning Corp., is now also president of the Processed Apples Institute, Inc.

John D. Warfield, Jr., is newly appointed vice-president of the Cook Chocolate Co., Chicago.

John A. Warren has been made vice-president in charge

James F. Parsons, Jr., is now sales manager for the Economic Machinery Co. (Bachrach photo)

Want more

information about

***products* and**

***services* in**

FOOD ENGINEERING?

Just in case you may have overlooked it, we call your attention to Free Reader Service in the back of the magazine, next to the back cover. Here you will find listed and indexed, all products and literature described in this issue.

The first part of the Index covers editorial items on new processing and packaging equipment, new supplies, and new literature.

The second part of the Index lists all products and services mentioned in the advertisements.

You will find regular use of the Free Reader Service department a means for getting increased value from your subscription to FOOD ENGINEERING.

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No matter what you may face in the way of a spraying problem, it can be solved quickly and at low cost with Spraying Systems Spray Nozzles. Two fact-packed catalogs—No. 22, General Industrial Spray Nozzles, and No. 23, Pneumatic Atomizing Nozzles—are yours for the asking. They show you all the various types of spray nozzles available . . . explain design and construction . . . and outline spray characteristics such as atomization, impact of spray and capacity. Write for your copies today.

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Corrugating Material—Liner Boards · Folding and Set-Up Boxboards · Can, Tube and Cap Stock · Beer Case Partitions. Mills at Quincy, Illinois; Vincennes, Indiana; Tama, Iowa; Denver, Colorado; Hutchinson, Kansas

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MODERN PRODUCTS FOR BETTER PACKAGING AND SHIPPING—*and better selling!*

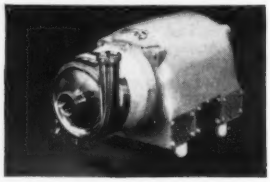
WHEN YOUR BUSINESS IS IN *Good Taste*

. . . why not let Cherry-Burrell help you keep it that way? With Cherry-Burrell sanitary pumps, tubing, valves and fittings handling your product, there's *no chance* to pick up undesirable flavors . . . *all the chance* in the world to protect your product's purity; your customers; your business.

CHECK CHERRY-BURRELL

FOR HIGH CAPACITY PUMPS

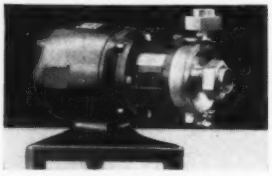
- Meet 3A Sanitary Standards
- Flexible design—discharge can be set at any angle
- Easy to dismantle and clean
- Totally enclosed motors
- Available in portable models
- Removable sanitary rotary carbon seal
- Blowout-proof gasketing



FLEXFLO PUMP—six sizes to 240 G.P.M. Motor sizes from ¼ h.p. to 10 h.p.

FOR LOW CAPACITY PUMPS

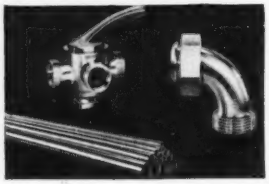
- Meet 3A Sanitary Standards
- Low-cost pump for small plants
- No stuffing box—simple rotary seal
- Parts sturdy enough for wash sink scrubbing
- Easy to dismantle—few parts



FLEXFLO MODEL "ON" PUMP—Capacity to 18 G.P.M.

FOR SANITARY TUBING, VALVES AND FITTINGS

- Complete line — available in stainless steel or famous DiaMonD metal (nickel alloy)
- Maximum interchangeability
- Designed to meet national 3A Standards for sanitary fittings



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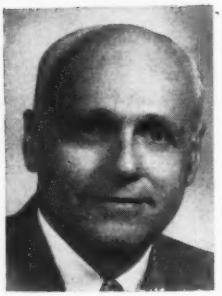

Carlton L. Shmock was recently made manager of sales for the central division of the Continental Can Co.'s paper container division.

of packaging for the American Management Assn.

Ralph E. Whiting is now general manager of Armour and Co.

J. S. Williams has been named director of sales for Puss 'n Boots division of Quaker Oats Co., Wilmington, Calif.

Associate Industry

Allis-Chalmers Mfg. Co. has purchased the plant of Victor Electric Products, Inc., Cincinnati.

Aluminum Co. of America has elected Lawrence Litchfield, Jr., president of two of its subsidiaries: Alcoa Mining Co., N. Y. C., and Surinaamsche Bauxite Maatschappij, Paramaribo, Suriname.

Amercoat Corp., South Gate, Calif., maker of protective coatings, has made W. A. Johnson, chairman, and A. E. Turner, president.

Beckman Instruments, Inc., announces the purchase of Berkeley Scientific Co., Richmond, Calif.

Bemis Bro. Bag Co. is promoting a new series of pictorial booklets dealing with importance of the vote. Cost is on sliding scale basis.

Colton Chemical Co., Cleveland, is new owner of the U. S. Rubber Co.'s Flotofoam insulation division. Product will now be known as Colfoam.

Glycerine Producers' Assn. announces awards to be given for outstanding research in glycerine or glycerine-derivative applications. Amounts: $200 to $1,000.

Gustin-Bacon Mfg. Co., Kansas City, Mo., has appointed F. H. Ebbert vice-president and general sales manager.

Marathon Corp., Menasha, Wis., has made Russell C. Flom director of sales for pulp, paper, and paperboard.

McKee Glass Div. of Thatcher Glass Mfg. Co., Elmira, N. Y., has made William R. Rifenburgh consumer products and export sales manager.

Norton Co., Worcester, Mass., expects to complete its plant expansion this winter. Cost: $6,000,000.

Shell Chemical Corp. announces appointing J. M. Selden East Div. manager.

Syntron Co., maker of materials handling apparatus, has organized a Canadian subsidiary, Syntron, Ltd., and purchased a plant in Ontario.

Deaths

Frank J. Belcher, Jr., 74, former president of Spreckels Sugar Co. and chairman of Tea Garden Products Co.—Jun. 23.

Norman H. Campbell, 65, president and manager of Lakeside Milling Co., Ltd., Ontario, which he founded in 1927.—Jun. 26.

Charles C. Carr, former director of public relations and advertising for Aluminum Co. of America.—Jul. 29.

Marion T. Fannaly, 55, president of Marion T. Fannaly, Inc., and Fannaly Fine Foods, Inc.—Aug. 5.

Henry F. Kleinfeldt, vice-president of Abbe Engineering Co., New York.—Jun. 6.

Morris H. Palmer, 39, director of manufacturing for Durkee Famous Foods Div. of the Glidden Co.—Jul. 21.

Wallace Tenney Montague, vice-president of the Norton Co., Worcester, Mass., passed away Jul. 30.

Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies —For Free Copies, Use Reader Service—

Food Plant Equipment

Product Picture Index

Pertinent data on entire line of equipment including vibrators, screens, feeders, and shakers are given in small Bulletin 525. 54 pages.—*Syntron Co., Homer City, Pa.*

Circle L225A on Reader Service Card

Power Pumps

Versatile application is stated possible with series of high-pressure power pumps. Diagrams, tables, and graphs support text. 30 pages.—*Food Machinery & Chemical Corp., John Bean Div., Industrial Pump Dept., Lansing 4, Mich.*

Circle L225B on Reader Service Card

Catalog on Air

Conditioning, cleaning, and handling of air are subjects covered in Catalog 600. Simplified chart for selecting proper equipment is added feature. 60 pages.—*Westinghouse Electric Corp., Pittsburgh 30.*

Circle L225C on Reader Service Card

Rotary Compressors

Three bulletins, Forms 2314, 15, and 16, discuss portable rotary compressors with power rated at 105, 210, and 315 cfm., respectively. 4 pages each.—*Ingersoll-Rand, 11 Broadway, New York 4.*

Circle L225D on Reader Service Card

High-Pressure Pump

Foldout bulletin illustrates general applications and advantages of high-pressure pump. Installation data and operating principles are noted. 6 pages.—*McCarty Co., 1206 Maple Ave., Los Angeles 15.*

Circle L225E on Reader Service Card

Icing Units

Modern methods of icing perishable products in transit and in storage are described in Book 2382. Crushers and slingers are included. 25 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle L225F on Reader Service Card

Safety Relief Valve

High B.t.u. rate is claimed for safety relief valve, subject of Bulletin 290. Built to safeguard boilers, tanks, and heaters. 4 pages.—*A. W. Cash Valve Mfg. Corp., Decatur 60, Ill.*

Circle L225G on Reader Service Card

New Dust Periodical

Vol. 1, No. 1, of *Dust and Fume Topics* is now available. Concerns itself with handling dust and fume problems and their control or alleviation. 4 pages.—*American Wheelabrator & Equipment Corp., 1404 S. Byrkit St., Mishawaka, Ind.*

Circle L225H on Reader Service Card

General Purpose Motors

Construction features, ratings, and dimensions of open drip-proof, splash-proof, and squirrel-cage induction motors are described in Bulletin 51B6410D. 6 pages.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee 1.*

Circle L225I on Reader Service Card

Proportioning Pumps

Catalog UP-52 gives information on line of mechanical-drive, U-type metering and proportioning pumps. Specifications and prices are listed. 24 pages.—*Hills-McCanna Co., 2442 W. Nelson St., Chicago 18.*

Circle L225J on Reader Service Card

Multi-Louver Dryer

Cooling, drying, and processing materials which require short treatment time are uses of multi-louver dryer explained in Catalog 2409. Material is well-correlated. 28 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle L225K on Reader Service Card

Sanitary Sifters

Products which have been used in gyratory sifters can reportedly be handled economically by all-metal sanitary sifter described in recent bulletin. Adaptable particularly to flour sifting. 4 pages.—*Allis-Chalmers Mfg. Co., Milwaukee 1.*

Circle L225L on Reader Service Card

Vibratory Feeders

Conveyor-type vibratory feeders with variable control of flow rate are new bulletin's subject matter. Diagrams and illustrations supplement text. 16 pages.—*The Syntron Co., Box 220, Homer City, Pa.*

Circle L225M on Reader Service Card

Impact-Type Pulverizers

Treated with here are units for pulverizing grindable and ungrindable materials. Cutaway showing process involved is included. 4 pages.—*Mead Mill Co.,*

Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water. *List Price $17.50*

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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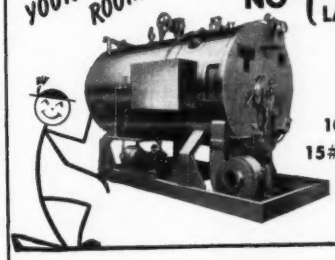
AMESTEAM GENERATOR

JUST SET IT ON YOUR BOILER ROOM FLOOR!

NEEDS NO { FOUNDATIONS, BRICKWORK, LARGE STACK



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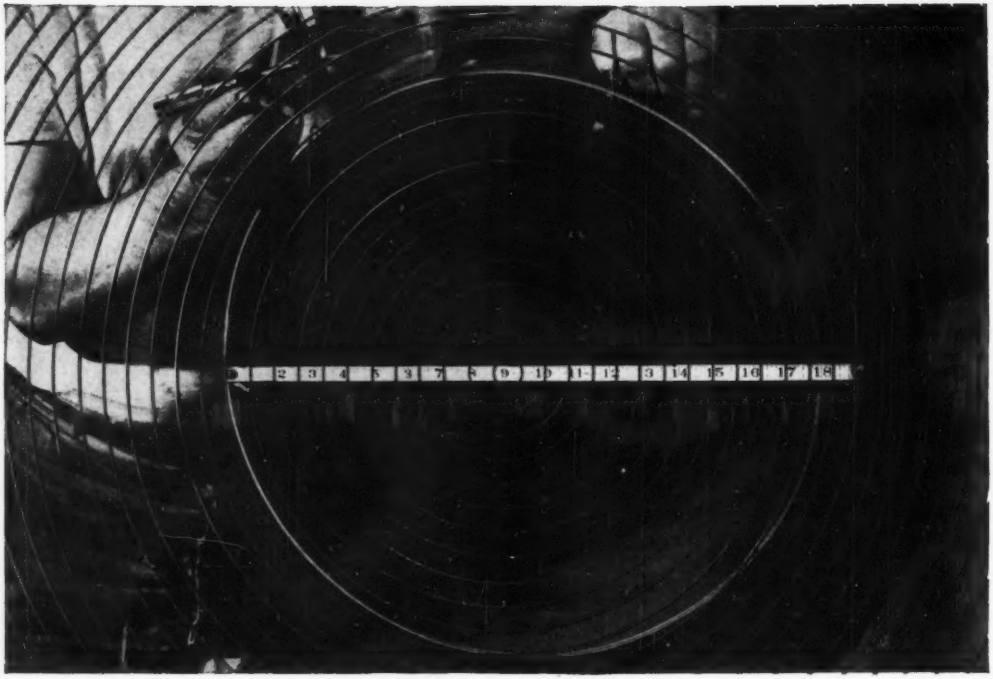

from 1/8" *to* 40" OD

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TRENTWELD *will meet your needs best*

Name an industrial application that calls for stainless steel tubing — and the tubing to name is TRENTWELD. Available in diameters from 1/8" to 40" OD TRENTWELD presents a broad range of grades, gauges and finishes.

Study the product and the plant where it is produced and you find the reason for the steady increase in TRENTWELD usage. For TRENTWELD is made in a *tube* mill by *tube* experts who roll and weld stainless and high alloy tubing without added rod metal. This Trent method results in metallurgically correct tubing with a uniform section and uniform corrosion resistance.

No matter how specialized your tubing needs may be, you will find there's a TRENTWELD tubing to meet your most exacting requirements. To call in Trent is to put our experience at your disposal. Write us full details of your most pressing problem involving stainless or high alloy tubing.

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STAINLESS STEEL TUBING

TRENT TUBE COMPANY. GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

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Circle L225N on Reader Service Card

Liquid & Sewage Units

Processing equipment for handling and treating solids-in-liquid combinations is topic of Bulletin G50. Section on sewage and waste treatment is of particular interest. 16 pages.—*Walker Process Equipment Inc., Aurora, Ill.*

Circle L227A on Reader Service Card

Dust Collector

Available in two models are bag-type dust collectors, subject of Bulletin 635. Units are recommended for collecting dust, chips, and shavings. 4 pages.—*Aget-Detroit Co., Ann Arbor, Mich.*

Circle L227B on Reader Service Card

Anent Motors

Dependability and endurance are qualities stressed in small bulletin on motors. Polyphase and single-phase motors are given. 4 pages.—*Wagner Electric Corp., 64 Plymouth Ave., St. Louis 14.*

Circle L227C on Reader Service Card

Units for Chocolate

Folder discusses types of chocolate-processing units. These include roaster, cleaner, refiner, cracker, and fanner. 4 pages.—*Jabez Burns & Sons, Inc., 11th Ave. & 43rd St., New York 36.*

Circle L227D on Reader Service Card

Feed Machinery

Pocket-sized pamphlet, *Four Positive Additions to Multiply Feed Mill Efficiency*, describes full line of feed machinery. 6 pages.—*Fairfield Engineering Co., Feed Machinery Div., Marion, Ohio.*

Circle L227E on Reader Service Card

Control Equipment

Demineralizer Units

Controlled purity is claim of small folder describing demineralizer units for water treatment. 6 pages.—*A. E. Tomkin & Co., 1828 Columbia Rd., Washington. 9.*

Circle L227F on Reader Service Card

Transformer Line

Principles of different transformers are explained in new release, Bulletin R-31. Linear transducers, indicators, and recorders are three of many items portrayed. 12 pages.—*Automatic Temperature Control Co., 52 Pulaski Ave., Philadelphia 44.*

Circle L227G on Reader Service Card

Humidity Conditioners

Case histories are included in Bulletin K-152 depicting humidity conditioning equipment. Companies using units are listed. 8 pages.—*Surface Combustion Corp., Toledo 1.*

Circle L227H on Reader Service Card

Flow Meters

Variable-area flow meters designed for high temperatures and pressures are covered in Catalog 40. 12 pages.—*Fischer & Porter Co., Hatboro, Pa.*

Circle L227I on Reader Service Card

Bin Level Indicators

Illustrated catalog discusses bin level indicators, which may also be used with tanks, hoppers, etc. Numerous wiring diagrams included. 20 pages.—*Bin-Dicator Co., 13946-77 Kercheval, Detroit 15.*

Circle L227J on Reader Service Card

Analytical Equipment

New Bulletin 15-14 offers data on analytical equipment for laboratory and measurement fields. Titrators, spectrometers, and gas analyzers are included. 96 pages.—*Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44.*

Circle L227K on Reader Service Card

Recorders, Controllers

Application of a variety of instruments to recording and control problems is theme of Catalog ND46(1). Diverse measuring devices are listed. 50 pages.—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44.*

Circle L227L on Reader Service Card

Filling Scale

Leaflet describing performance and specifications of fully automatic filling scale is now obtainable. Claimed is accuracy-load within plus or minus 1/10 lb. from 25 to 200 lb.—*Thayer Scale & Engineering Corp., E. Water St., Rockland, Mass.*

Circle L227M on Reader Service Card

Laboratory Apparatus

What's New for the Laboratory is title of bulletin outlining apparatus for laboratory use. Items featured are adjustable-type thermometer, glass tubing manipulator, and others. 16 pages.—*Scientific Glass Apparatus Co. Inc., Bloomfield, N. J.*

Circle L227N on Reader Service Card

Flow Regulators

Bulletin 521 describes line of flow rate regulators. It states units are unaffected by pressure fluctuations and gives examples of use. 4 pages.—*W. A. Kates Co., 430 Waukegan Rd., Deerfield, Ill.*

Circle L227O on Reader Service Card

Extra rugged in construction

WELLS, PUMPS—COMPLETE WATER SUPPLY UNITS

Layne puts a lot of extra ruggedness into the construction of their well and pump installations. This means that there is seldom repair expense of any kind for years to come. And matching ruggedness is the widely known and acknowledged Layne quality.

Why not have Layne install a water well supply on your property? The saving in water cost will more than justify the expense. For further information, catalogs, etc., address

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. . . for efficiency's sake . . .

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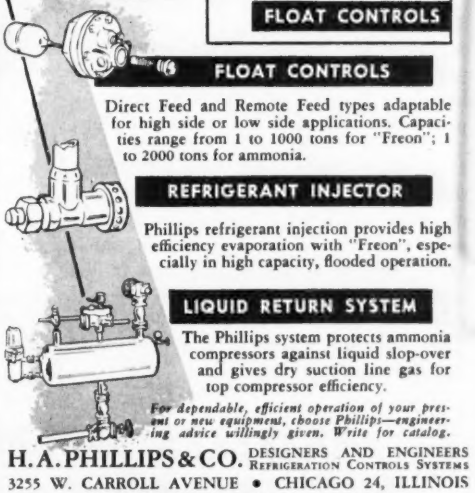

FLOAT CONTROLS

Direct Feed and Remote Feed types adaptable for high side or low side applications. Capacities range from 1 to 1000 tons for "Freon"; 1 to 2000 tons for ammonia.

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Phillips refrigerant injection provides high efficiency evaporation with "Freon", especially in high capacity, flooded operation.

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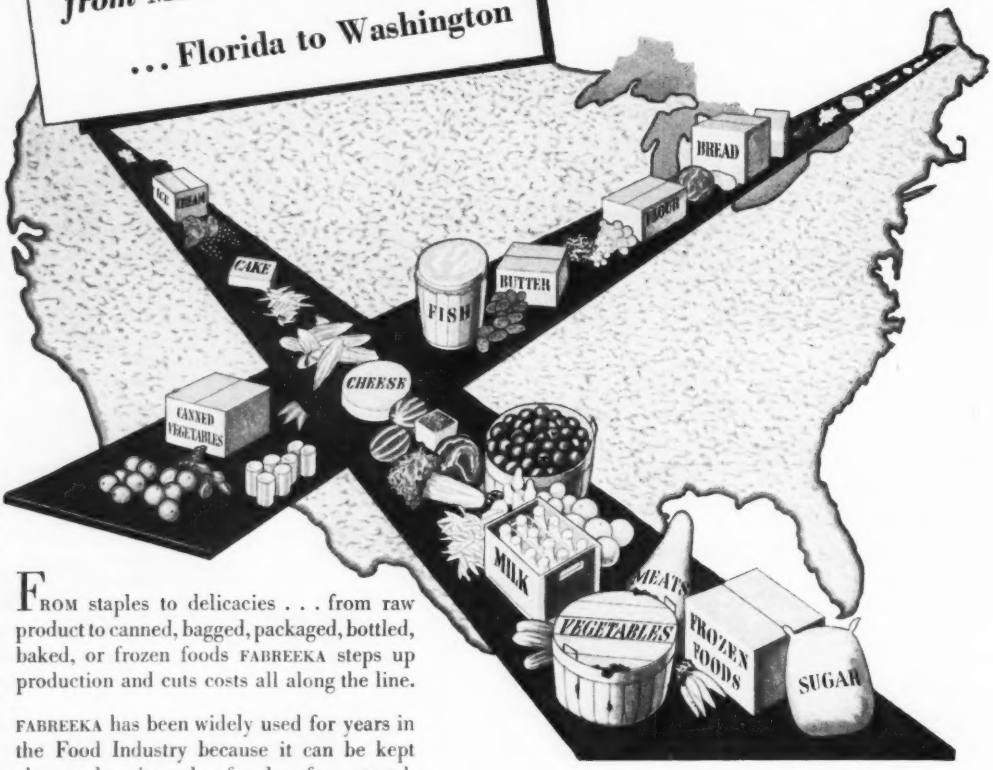

FROM staples to delicacies . . . from raw product to canned, bagged, packaged, bottled, baked, or frozen foods FABREEKA steps up production and cuts costs all along the line.

FABREEKA has been widely used for years in the Food Industry because it can be kept clean and sanitary, has freedom from stretch and shrink, resists extreme heat, cold, water, brine, and chemicals encountered in the industry. Made of specially woven cotton duck and rubber, — FABREEKA Belting is True-tracking, Flexible and has Great Strength and Long Life . . .

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NEW YORK CHICAGO DETROIT SPARTANBURG PHILADELPHIA PITTSBURGH OAKLAND

Net-Weight Fillers

Well-documented Catalog 101 presents net-weight fillers for gravity and power feed with accessory and associated equipment. 20 pages.—*B. F. Gump Co., 1325 S. Cicero Ave., Chicago 50.*

Circle L229A on Reader Service Card

Anent Filler

Fingertip control is alleged for filling device described in Leaflet 481. Compactness and simplicity are qualities stressed.—*Weigh Right Automatic Scale Co., Joliet, Ill.*

Circle L229B on Reader Service Card

Materials Handling

Casters & Trucks

Itemized data on casters and hand trucks are given in comprehensive Catalog CT-52. Numerous graphs accompany illustrations. 36 pages.—*Rapids-Standard Co., Inc., Rapistan Bldg., Grand Rapids 2.*

Circle L229C on Reader Service Card

Wheels & Casters

Aluminum wheels and casters of various types for many uses are amplified in handsome bulletin. Specifications are given with advantages and applications. 24 pages.—*Aerol Co., Inc., 51 E. 52nd St., New York 17.*

Circle L229D on Reader Service Card

Hydraulic Lift Trucks

Easy one-man handling of heavy skid and box loads is claimed for hydraulic lift trucks noted in Bulletin 525. Operational characteristics are outlined. 8 pages.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle L299E on Reader Service Card

Unscrambling Table

Leaflet presents unscrambling table designed to feed cans or bottles single file to standard conveyors. Feed is gaged to line operation.—*R. Howard Strasbaugh Bottlers Equipment, 10990 Santa Fe Ave., Lynwood, Calif.*

Circle L229F on Reader Service Card

Chain Hoist

Empowered by electricity, chain hoist explained in Bulletin 150 is available in pendant rope or push button control. Price list and accessories are noted. 18 pages.—*Chisholm-Moore Hoist Corp., Fremont Ave., Tonawanda, N. Y.*

Circle L229G on Reader Service Card

Gravity Conveyors

Descriptive data on gravity wheel conveyors are found in Bulletin 201. Available from 12 to 24 in. widths. Well documented. 24 pages.—*Harry J. Ferguson Co., 149 W. Ave., Jenkintown, Pa.*

Circle L 299H on Reader Service Card

Packaging Machines

Carton forming and lining machines plus folding and closing machines are touched upon in recent bulletin. Applications illustrated. 8 pages.—*Peters Machinery Co., 4700 Ravenswood Ave., Chicago 40.*

Circle L299I on Reader Service Card

Pallet Truck

Design shown in Leaflet 730 represents straddle-type tiering truck for double-face pallets. Eliminates counterweight; has capacity of 2,000 lb.—*Raymond Corp., 6291 Madison St., Greene, N. Y.*

Circle L229J on Reader Service Card

Wrapping Units

Electric eye wrapping units—particularly in regard to tomato packaging—are subject of recent bulletin. 4 pages.—*Hayssen Mfg. Co., Sheboygan, Wis.*

Circle L229K on Reader Service Card

Plant Supplies

Rubber Tires

Handbook on solid and cushion-type rubber tires gives descriptions of large variety. Information is concise on all aspects. 28 pages.—*Monarch Rubber Co., 23 Lincoln Park, Hartville, Ohio.*

Circle L299L on Reader Service Card

Acid Detergent

Pocket-size pamphlet aims specifically at dairy industry concerning use of acid detergent as cleaning agent. Cites numerous advantages. 8 pages.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

Circle L299M on Reader Service Card

Strip Steel Products

Articles on strip steel products and related strapping and carton closing operations are found in Vol. 3, No. 1 of *Confab.* 12 pages.—*Acme Steel Co., 2840 Archer Ave., Chicago 8.*

Circle L299N on Reader Service Card

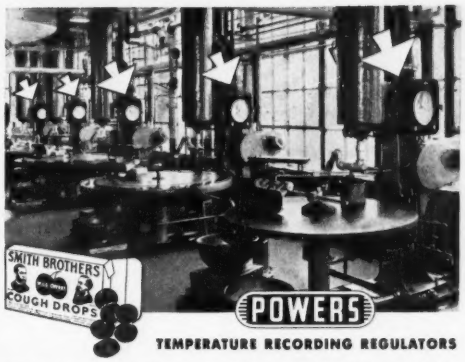
Floor Matting

Aid in selection of floor matting for plants is function of recent brochure. Range of types and applications is wide. 8 pages.—*D. W. Moor Co., 1797 Adams St., Toledo 2, Ohio.*

Circle L229O on Reader Service Card

Safety Tools

Bulletin ST-5 covers data on variety of safety tools. Sizes and weights plus material composition are given. 4 pages.—*Ampco*



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Above: Recording Regulator

Right: Powers Flowrite Valve

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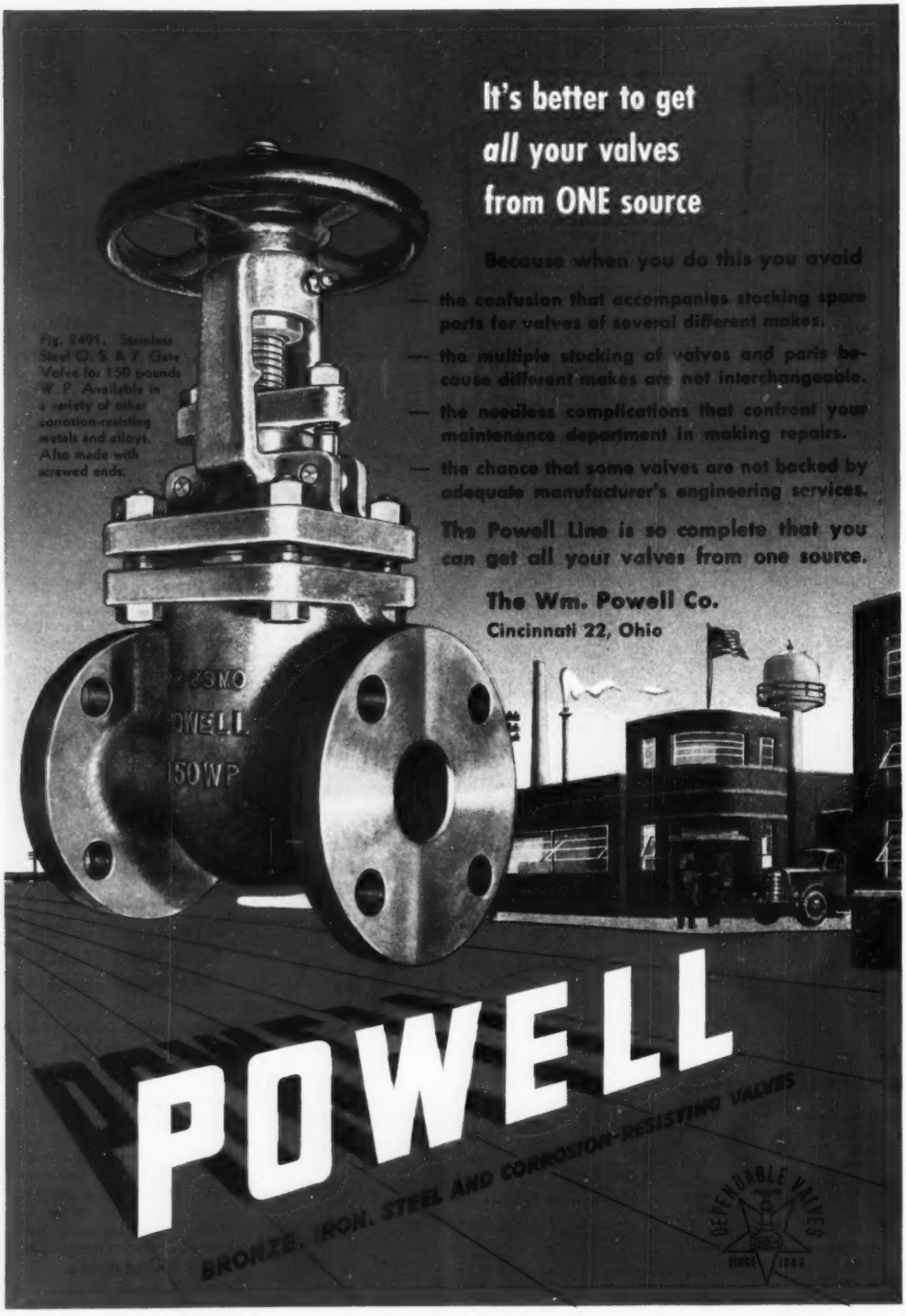
It's better to get
all your valves
from ONE source
Because when you do this you avoid
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— the multiple stocking of valves and parts because different makes are not interchangeable.
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— the chance that some valves are not backed by adequate manufacturer's engineering services.
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SINCE 1842

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Circle L229P on Reader Service Card

Concrete Floors

Profusely illustrated bulletin, *Traffic Concrete—A Study in Specialization*, explains concrete floors in terms of materials and methods of installation. 20 pages. —*Flash-Stone Co., 3723 Pulaski Ave., Philadelphia, 40.*

Circle L231A on Reader Service Card

Box-Sealing Tape

Application of pressure-sensitive, box-sealing tape is treated in attractive bulletin. Six tapes are described. 4 pages.—*Minnesota Mining & Mfg. Co., St. Paul 6, Minn.*

Circle L231B on Reader Service Card

Versatile Fabrics

Cotton and rayon swatches are highlights of booklet stating characteristics of material. Handy for picking right material for the job.—*Visking Corp., N. Little Rock, Ark.*

Circle L231C on Reader Service Card

Rubber Matting

Skidproof and shock absorbing rubber-link matting is subject matter of new brochure. Practically any size can be supplied, states maker. 4 pages. *Koffler Sales Corp., 3757 N. Racine Ave., Chicago 13.*

Circle L231D on Reader Service Card

Colorful Enamels

Forty-eight colors are possible with use of enamels noted in new brochure. Intermixing is key states company, thus dispensing with need for color tubes and tinting bases.—*Wilbur & Williams Co., 130 Lincoln St., Brighton 35, Mass.*

Circle L231E on Reader Service Card

Storage Battery

Truck and auto storage battery, described in illustrated bulletin, is claimed to be vibration-, buckle-, and corrosion-proof. Advantages are listed along with specific details on use. 8 pages.—*Chicago Forging & Mfg. Co., 1317 W. North Ave., Chicago 22.*

Circle L231F on Reader Service Card

Miscellaneous

Fence Painters

Units for painting fences of all types are considered in bulletin which includes prices. 8 pages.—*Meinhardt Cleaning Materials Co., 2314 W. Van Buren St., Chicago.*

Circle L231G on Reader Service Card

Tile Uses

Booklet 300, attractively illustrated, points to numerous uses of tile. Result is lower maintenance and repair, states maker. 20 pages.—*American-Olean Tile Co., 917 Kenilworth Ave., Lansdale, Pa.*

Circle L231H on Reader Service Card

Accounting Machine

Efficient control of customer records and sale-distribution details are possible via accounting machine noted in Booklet AB-587. 6 pages.—*Remington Rand Inc., 315 4th Ave., New York 10.*

Circle L231I on Reader Service Card

Seven Tapes

Folder on pressure-sensitive tapes describes seven in all and their uses. Includes photos of actual applications. 4 pages.—*Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6.*

Circle L231J on Reader Service Card

Ice Makers

Automatic flaked-ice makers are subject of new folder. Four units are described. 6 pages.—*American Gas Machine Co., Albert Lea, Minn.*

Circle L231K on Reader Service Card

Cream Chart

Copy of *Cream Defects—Their Causes and Preventions* is now available. Chart measures 8½ x 13 in.—*Pfaudler Co., Rochester, N. Y.*

Circle L231L on Reader Service Card

Water Cooler Placement

Man-hour savings are accented in bulletin on proper placement of water coolers. Data is included on checking efficiency of units. 4 pages.—*General Electric Air Conditioning Div., Bloomfield, N. J.*

Circle L231M on Reader Service Card

Battery Chart

Check-chart on motive-power batteries, measuring 17x32 in., lists rules to follow to insure longer and dependable battery life. — *Gould-National Batteries, Inc., Trenton 7.*

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Free Literature—Quick Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard inside the back cover. Then sign at the bottom and mail. No postage is required.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

he's working for you

THIS FELLOW IS TRAINED IN YOUR BUSINESS. His main duty is to travel the country — and world — penetrating the plants, laboratories and management councils . . . reporting back to you every significant innovation in technology, selling tactics, management strategy. He functions as your all-seeing, all-hearing, all-reporting business communications system.

THE MAN WE MEAN IS A COMPOSITE of the editorial staff of this magazine. For, obviously, no one individual could ever accomplish such a vast business news job. It's the result of many qualified men of diversified and specialized talents.

AND, THERE'S ANOTHER SIDE TO THIS "COMPOSITE MAN," another complete news service which complements the editorial section of this magazine — the advertising pages. It's been said that in a business publication the editorial pages tell "how they do it"—"they" being all the industry's front line of innovators and improvers—and the advertising pages tell "with what." Each issue unfolds an industrial exposition before you — giving a ready panorama of up-to-date tools, materials, equipment.

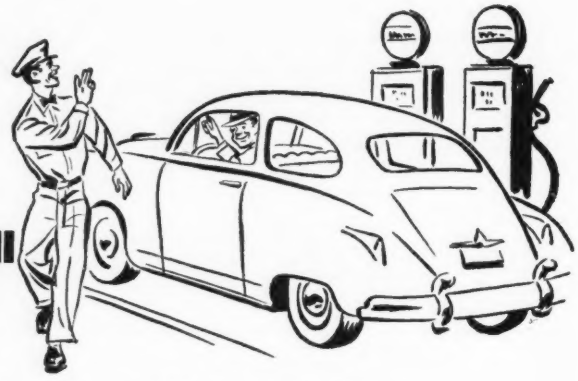
SUCH A "MAN" IS ON YOUR PAYROLL. Be sure to "listen" regularly and carefully to the practical business information he gathers.

McGRAW-HILL PUBLICATIONS

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



Nobody knows for sure how it started—this line about "See you at the Polls!" we're hearing all over these days.

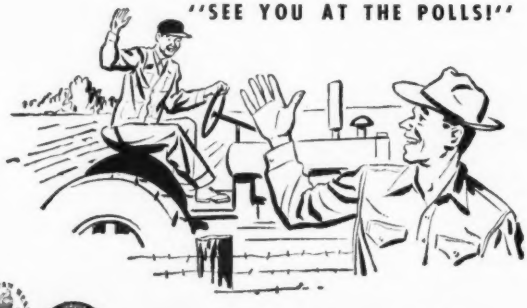
Best explanation seems to be that it came from that state candidate out west. . . . His opponent in a debate got all riled up and challenged him to fight it out in the alley.

But he said—"I'll settle this the AMERICAN way—I'll see you at the polls!" And the audience picked up the chant.

Now everybody's saying it—and on Nov. 4 everybody will be *doing* it!

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



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New Advertisements
received by September 25th will appear in the October issue subject to limitation of space available. Address copy to the
FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., Inc.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

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CARROT OIL
makes foods
golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
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the advertisements in the SEARCHLIGHT SECTION on the following pages are live opportunities in the field of food processing and distribution.
Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.
"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.
for EVERY business WANT "Think SEARCHLIGHT first"

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The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS Address New York Office, 330 W. 42nd St., New York 36, N. Y., for the October Issue closing September 25th

COMMISSARY MANAGER

Exceptional opportunity for well-trained and qualified Commissary and Food Specialist to direct food activity and supply for a large foreign operation of an American-owned Company. Service headquarters located in New York. Applicants must be thoroughly experienced in the fields of Commissary Management and Food Supply, with at least 15 years continuous experience in these lines, and must have attained Management Capacity. Desirable age bracket 38-45 years. Forward full qualifications, record, references, salary requirements. Attach small photo or snapshot.

P-5287, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

FOOD TECHNOLOGIST—Progressive manufacturer of bakers and confectioners supplies wishes to expand product line. Would like to employ recent graduate to work on development problems. Send complete resume with reply. P-5247, Food Engineering.

MEAT PROCESSOR and Canner-Middle aged married man preferred with complete knowledge for the preparing and canning of Sausages-Hamburgers-roast etc, for staring operating pilot plant on the Island of "Jamaica"-British West Indies. Apply in own hand writing stating experience and salary wanted to Smith Equipment Co. Ind. 98 Forsyth Street, New York 2, N. Y.

RESEARCH EXECUTIVE. Large Eastern Food Manufacturer has opening for Research Executive. Should have Ph.D. degree in Chemistry or Biochemistry although degree is not as important as demonstrated research accomplishments. Must have at least 5 years experience in directing active research program, part of this time at the project level. Must have demonstrated executive ability, be aggressive and have leadership qualities necessary to keep active research program moving at top speed. Age 35-45. Submit complete resume, salary requirements and recent photograph in first letter. P-4535, Food Engineering.

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REPRESENTATIVES WANTED. Incandescent, Fluorescent, infra-red heat, photo-flood and photo-flash lamps. Also renewable cartridge and plug fuses, solderless wire connectors and fluorescent starters. Many choice territories available. Send replies to RW-4529, Food Engineering.

WANTED: CHEMICAL Engineering for selling and servicing necessary basic ingredient to confectioners, bakers, ice cream and jam, jelly and preserve manufacturers. Preference given to experience in above lines. Must be willing to travel. Our company is large with well established national distribution and excellent reputation. Replies will be considered confidential and should include complete resume of personal qualifications with experience and salary expected. SW-4799, Food Engineering.

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SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

CEREAL CHEMIST-Bakery Technologist. Nationally acquainted Bakery Technologist age 38 with 15 years large bakery experience via laboratory covering all Bakery Products, desires opportunity as Executive Assistant or in sales field working with Research, Development and service of Bakery Ingredients or equipment. Some knowledge of milling, special product processing, with public speaking experience. PW-5219, Food Engineering.

FLAVOR AND Essential Oil Chemist, previous experience in food production, plant administration. PW-5136, Food Engineering.

FOOD CHEMIST, PhD, background in physical, organic, analytical chemistry and engineering, with diversified experience in fundamental, applied research and product development, desires position in technical management. PW-5248, Food Engineering.

FLAVOR CHEMIST who likes the work and has thorough knowledge of flavors and their use from a scientific as well as practical viewpoint desires change to position where a top notch man is needed to revitalize line. Will consider part time employment for a number of non-competitors in food and flavor industries who normally could not use the full time services of a flavor specialist. Not interested in "Peddling formulae" or positions with brightly painted pictures. If flavor problems are a continual part of your business would appreciate hearing from you. PW-5277, Food Engineering.

FOOD TECHNOLOGIST, Chem. Engr. formerly associated with nationally known organizations, recognized for ability as Plant Mgr, Cost and Product Control, Lab. Supervision & Development. Exp. in all phases of Fruit Field, Jam, Jellies, ice cream Mfg'rs, Bakers & Conf. Supplies, preserving, canning many additional items & Spec. Work from raw mat'l procurement thru mfg'd item, from lab. thru plant, incl. Sales organization & training. An asset to any concern because of ability to accept responsibility & think clearly. Useful where young blood is needed or where burden of responsibility needs sharing. Gen. N.Y.-N.J. area preferred. PW-5243, Food Engineering, 330 W. 42nd St., New York 36, N. Y.

POSITIONS WANTED

FROZEN FOODS Technologist thoroughly experienced production, developments and methods improvement projects desires suitable connection in manufacturing and quality control preferably with established packer of meats, fish or poultry products. PW-5262, Food Engineering.

ICING SUPERINTENDENT, age 41, 19 years experience in Biscuit & Cracker Industry. Now employed as Icing Sup't in large New England plant. Free to travel, desire to leave New England. Best references. PW-5226, Food Engineering.

RESEARCH & Production Chemist, with wide experience in many phases of manufacture and development of confectionery, chocolate, many desserts, cereal products, and other foods, desires position of responsibility to fully use his ability. PW-5140, Food Engineering.

WORKING FOREMAN capable. Expert commercial chef. Over 25 years Practical and Technical experience in production quality foods. Tomato and vegetable products. Preserves allied lines. Soups, meats, sauces, condiments and various products for the Italian trade. Will relocate. PW-5117, Food Engineering.

SELLING OPPORTUNITIES WANTED

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IMPORTANT FRENCH Company specialist in food machinery and equipment manufacturing with large possibilities in production and sales, would be interested by exclusive licenses of new machines or equipments in food industris for France and European countries. Address S.E.I.L.A. 16, rue Chauveau Lagarde-Paris (8) France.

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WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisemen. Capital letters following page numbers identify products and literature described in monthly editorial departments.

The same numbers appear on the postcard in numerical order.

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SEPTEMBER, 1952

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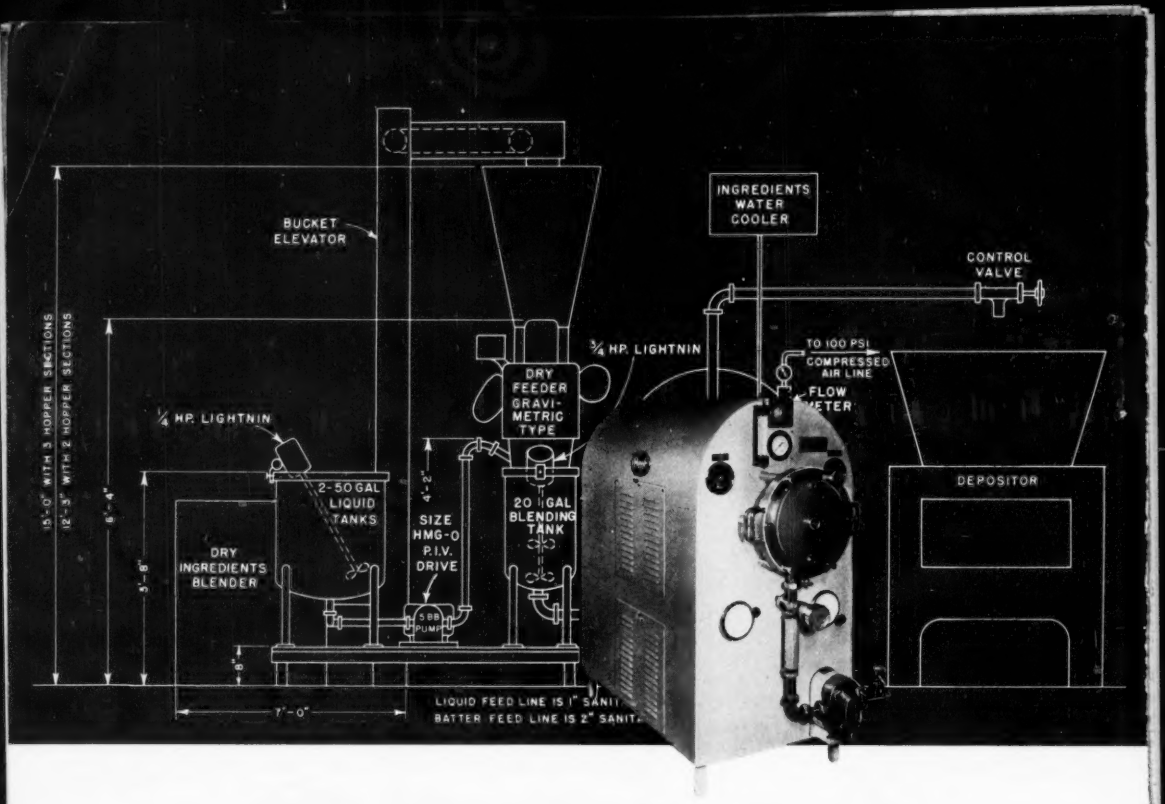

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